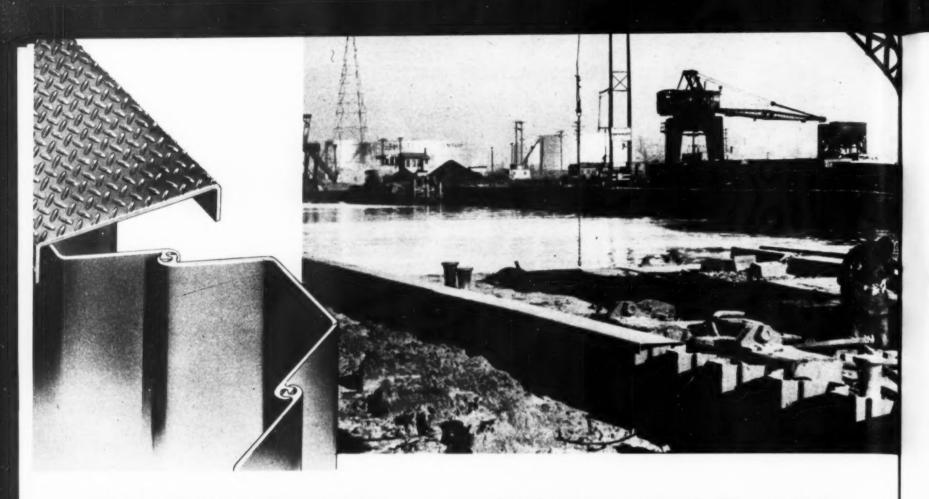
# PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

MAY 22 1941

TWO POWER HOUSES of steel-frame construction, equipped with 11 boilers and 11 turbo-generators, will supply steam and electricity for making smokeless powder at Indiana Ordnance Works.

In This Issue:



### INLAND PILING with FLOOR PLATE CAP Adds Safety to New Dock

THE 4-way safety, and structural strength, of Inland Floor Plate have been effectively used to cap 615 ft. of steel piling, recently driven at East Chicago, Ind., for the United States Gypsum Co. Four hundred tons of Inland Steel Sheet Piling were driven inside the wooden dock line. Inland Piling is especially designed to drive freely and straight. The interlocks remain strong and tight under tension. This new piling was attached to the existing anchorage system, before the old wooden piling was pulled.

Capping the entire 615 ft. of Inland Piling is Inland 4-Way Floor Plate, cold formed in

12-ft. lengths. Each length is a flanged channel, 12 in. across the top, with 3-in. legs. The lengths were welded, end to end with legs down, to form a continuous cap over the piling. This floor plate cap was then welded to the piling.

When compared with other types of construction, a considerable saving was made on this installation, proving the economy of Inland Steel Sheet Piling and 4-Way Floor Plate when used for dock work. Not only does Inland Floor Plate improve the appearance of the dock, but it provides added safety in all kinds of weather.

SHEETS - STRIP - TIN PLATE BARS - PLATES - FLOOR PLATES - STRUCTURALS - PILING LECHNOLOGY RAILS - TRACK ACCESSORIES - REINFORCING BARS

### INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

#### **CURRENT JOBS**

.... and Who's Doing Them

#### BUILDINGS I

Public—In Center Line, Mich., Hudson Motor Car Co., of Detroit, was awarded \$20,000,000 contract by Navy Department to construct and equip plant for manufacture of ordnance equipment. In Cleveland, Ohio, Chase Brass & Copper Co., of Cleveland, received War Department contract to construct additional plant facilities for manufacture of ammunition brass and cartridge cases at cost of \$16,000,000, to be financed by Defense Plant Corp. Successful bidder for Army contract to build general depot, warehouses and utilities in Atlanta, Ga., was A. Farnell Blair, of Decatur, with bid of \$4,271,084. Turner Construction Co., of Boston, Mass., will erect another plant for manufacture of aircraft engines for Pratt & Whitney Aircraft Division in East Hartford, Conn., at cost of \$3,522,000. Construction of non-commissioned officers' quarters and heating plants for Army in Anchorage, Alaska, is under way by Sound Construction & Engineering Co., J. B. Warrack Co., of Seattle, Wash., and Peter Kiewit & Sons Co., of Omaha, Neb., for \$3,157,780.

Contract to build plant for manufacture of aircraft parts in Bristol, Pa, was awarded by War Department to Fleetwings, Inc., of Bristol, for \$2,483,919, to be financed by Defense Plant Corp. At Camp Claiborne, Alexandria, La., W. Horace Williams Co., Inc., of New Orleans, will build regimental commanders' quarters, mess hall, administration and recreation building for \$2,036,785. Navy Department awarded contract to Ford, Bacon & Davis, Inc., of New York City, to improve power plant at training and torpedo station in Newport, R. I., for \$2,940,000 on cost-plus-fixed-fee basis. Defense housing project consisting of 800 dwelling units, at Portsmouth, N. H., is under way by T. O'Connor & Co., of Cambridge, Mass., for \$2,674,500. Sam W. Emerson Co., of Cleveland, Ohio, will erect 1-story brick factory, power house, office and engineering building, and storage buildings for Thompson Aircraft Co., of Cleveland, at estimated cost of \$1,000,000, to be financed by Defense Plant Corp. Successful bidders for North American Aviation Co. assembly plant contract to be constructed in Kansas City, Kan., were G. L. Tarlton Contractor Inc., local contractor, MacDonald Construction Co., of St. Louis, Mo., and S. Patti Construction Co., Inc., of Kansas City, Mo., with price of \$3,706,484. In Palacios, Tex. temporary barracks and necessary facilities to provide for 12,000 troops at Camp Hulen are under way by Knutson Construction Co., Russ Mitchell, Inc., and T. B. Hubbard Construction Co., of Houston, for \$3,456,560 on cost-plus-fixed-fee basis. At Camp Roberts, Nacimento, Calif., Ford J. Twaits Co., and Morrison-Knudsen Co., of Los Angeles, will construct field artillery camp, consisting of 250 buildings, for \$3,000,000. In Hitchcock, Tex., Wohiled. Dalton-Dellone, local contractors, were awarded contract for replacement camp and facilities, including barracks, warehouses, shops, mess halls, hospital and utilities for \$4,143,630 on cost-plus-fixed-fee basis.

#### HEAVY CONSTRUCTION

At Washington National Airport, Gravelly Point, Va., John McShain. Inc., of Philadelphia, Pa., was low bidder for contract to build hangars at price of \$2,028,200. Contract for shipbuilding drydocks at New York Navy Yard, Brooklyn, N. Y., was awarded to Walsh Construction Co., J. Rich Steers, Inc., Cauldwell-Wingate Co., and Raisler Corp., local contractors, at price of \$31,000,000 on cost-plus-fixed-fee basis. T. E. Connolly, of San Francisco, received contract to construct pressure tunnels and surge chambers in Pulga, Calif., for approximately \$6,000,000. Air base is under construction in Albany, Ga., by Hardaway Contracting Co., of Columbus, for \$2,350,000 on cost-plus-fixed-fee basis. Another contract for construction of air base in Victoria, Tex., was awarded to American Construction Co., of Houston, with bid of \$2,480,000. U. S. Maritime Commission will finance the building of three additional shipways in Portland, Ore, by Oregon Shipbuilding Corp., for \$1,875,000. A \$1,408,535 contract for air base facilities at airport in Meridian, Miss., went to A. B. Friend, Volz Construction Co., Rock City Construction Co., and Flint-Jordan Construction Co., of Jackson, Miss. Columbia Construction Co., of Oakland, was successful bidder for contract to build detached breakwater in Los Angeles and Long Beach harbors, Calif., at cost of \$10,321,300.

Among recent highway and bridge contract awards are the following: Alabama: \$312,585 to G. White, of Tennessee. Connecticut: \$359,941 to M. A. Gammino Construction Co., of Providence, R. I. Illinois: \$440,000 to Madison Construction Co., of Edwardsville, Minnesota: \$280,843 to Anderson & Sons, of Minneapolis. New Jersey: \$360,878 to Thomas Gallo, of Irvington. Ohio: \$368,197 to Carl Myrs. of Campbellsburg, Ind.; \$226,546 to Howitz Co., of Cleveland. Pennsylvania: \$210,142 to Hinaman Bros. Construction Co., of Pittsburgh; \$238,500 to Walker Bros., of Chambersburg. Bethlehem Steel Co., of Bethlehem, Pa., was awarded contract for bridge superstructure across Mississippi River between Iowa and Illinois, with bid of \$1,588,618 A \$647,372 contract for viaduct and ramp approaches in New York, N. Y., went to Lynn Construction Co., local contractor. For grade elimination contract in New York, J. Leopold & Co., local contractor, was low bidder at price of \$1,219,794.



### The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How ALUMINUM RIBS were erected to form framework for mobile

		tent. — p. 39
	How	SMOKELESS POWDER PLANT, costing \$86,000,000, is being
	, 10 W	built in 10 months by 23,000 construction workers p. 42
	How	TRAILER CAMPS were established to house construction
		workers. — p. 43
	How	PAY ENVELOPES were distributed to workers by trailer wag-
		ons on huge project. — p. 43
	How	PHYSICAL TESTS were applied to applicants for construction
		jobs. — p. 44
		TRUCK-MIXERS distributed 1,000 cu.yd. of concrete daily
		over 2,700-acre site. — p. 46
	How	PORTABLE HOPPERS facilitated transfer of concrete from truck-mixers to hand carts.  — p. 47
	How	CANVAS TARPAULINS protected concrete building construc-
	110 W	tion during cold weather. — p. 48
	How	PREFABRICATED MATERIALS were produced in temporary
		shops for big construction job, — p. 49
	How	PORTABLE GENERATOR SET supplied power to small tools
		in isolated spots. — p. 50
	How	SECTIONAL STEEL SCAFFOLD assisted roofers in placing
		corrugated asbestos-cement sheets. — p. 53
	How	SELF-STACKING TRUCK saved time in unloading brick.
	11	"CHERRY PICKER" passed muck cars in tunnel p. 58
		TRACTOR-CRANE placed steel lining plates for penstock
	HOW	tunnels. — p. 58
	How	MECHANICAL FINISHER handled 4-ft. concrete widening
		strip on highway slab p. 59
	How	UNDERPINNING supported elevated railway piers during sub-
		way construction p. 59
	How	WALLS OF WOOD BARRACKS were fabricated flat on ground
		and then up-ended by crane. — p. 62
	How	TRAVELING PLANT placed concrete for slope protection on
	11	earth dam. — p. 64
	HOW	ARMY IS DIRECTING billion-dollar construction program.  — p. 67
1	How	SHOP-BUILT SECTIONS of small houses were trucked to
	w	site and bolted into units. — p. 70
		p. 19

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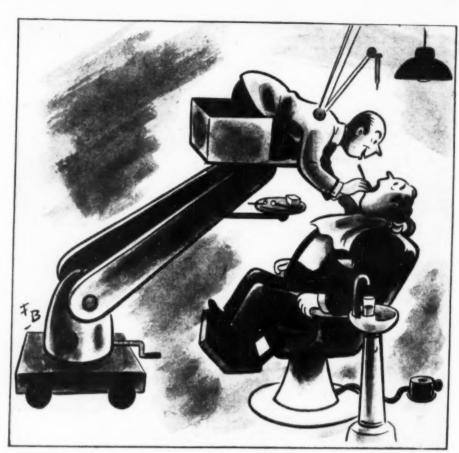
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JAMES H. McGRAW, Jr.

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"I picked up the idea from watching a construction crane!"

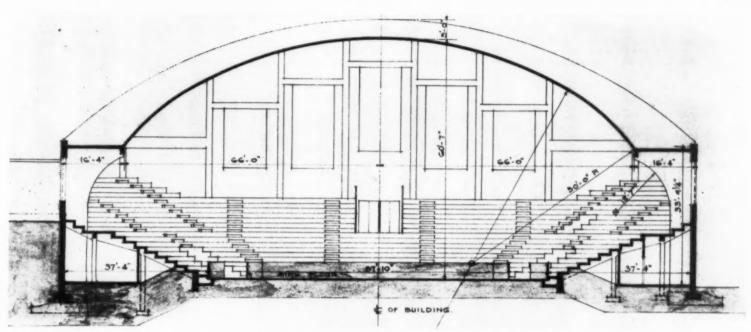


"Kelly was formerly with the Brooklyn Dodgers!"



"Poor man! Why doesn't he put on a coat if he's so chilly?"

### **COMPLETED 6½ WEEKS SOONER**









Contractor: White Construction Co., New York Engineers: Roberts & Schaefer Co., Chicago-Washington Architect: Joe Harry Lapish, Washington

#### 'INCOR' SAVED \$1.85 PER CU. YD. OF CONCRETE IN PLACE

OUTSTANDING in design and execution, the Uline Skating Arena, Washington, D. C., provides maximum unobstructed usable floor space through effective use of reinforced concrete. The roof, of Z-D design, has a clear span of 156 ft. between hinges. Two-hinged arch ribs, 36 ft. apart, support the 3%-in. concrete shell.

Early use was essential, and White Construction Co., New York, general contractor, estimated that 6½ weeks could be saved (1) by using additional forms, or (2) with 'Incor' 24-Hour Cement and one form set.

The extra forms would have cost \$3,600. The extra cost of 'Incor' was only \$850. Both methods meant a saving of 6½ weeks in time or overhead costs. But 'Incor' showed a further saving of \$750 on heat protection.

#### Maximum Speed - Minimum Cost

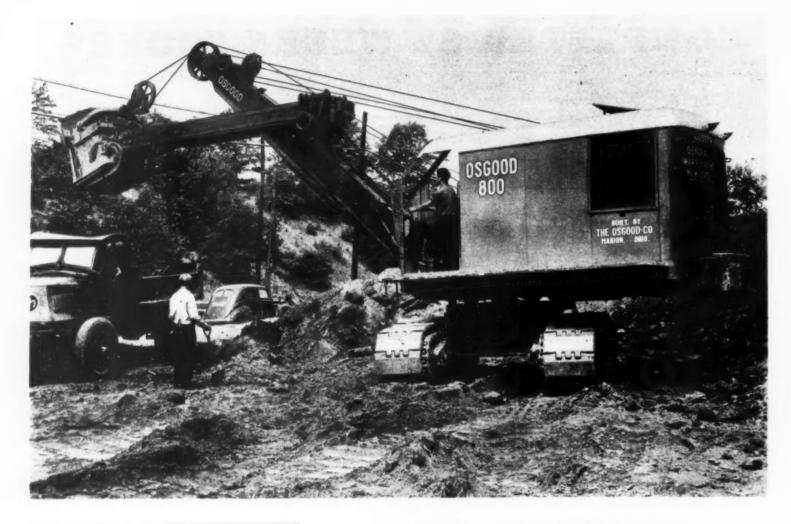
So it sums up this way: To save 6½ weeks with extra forms would have cost \$1,650 extra. 'Incor' produced the same speed at a net saving of \$1,850—or \$1.85 per cu. yd. of concrete in place.

These days, when time is vital, it pays to use 'Incor'\* for extra speed at lower cost. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2265, 342 Madison Avenue, New York.

\*Reg. U. S. Pat. Off.

### LONE STAR CEMENT CORPORATION

Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • KANSAS CITY • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.



# osgood

Type 80, Model 800 Air-Control Shovel owned by Joseph Grisafe of Warren Point, N. J. Air-Control is equally effective on shovel, dragline or crane work.

### AIR CONTROL SMOOTH AS STEAM?

Well, old time operators-who ought to know-say it is. Just as easy to handle-and quite as important-it's just as dependable.

> Write for our new illustrated Air-Control Catalog

### EXCAVATOR CO.

Sizes: 3 - 13 - 5 - 3 ; DIESEL - GAS - ELECTRIC

Associated with THE OSGOOD CO.

#### The HERCULE COMPANY

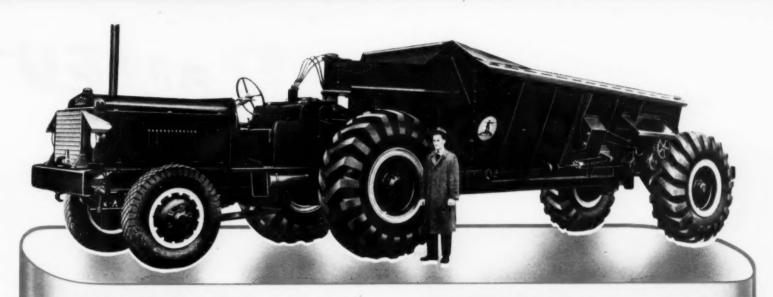
HERCULES \*IRONEROLLERS\* 6 to 12 Tons Diesel or Gasoline

Associated with THE OSGOOD CO.

### OSGOOD

1/2 to 21/2 Co. Yd. Diesel - Oil - Gas - Electric

**DRAGLINES - CRANES Crawler & Wheel Mounted** THE OSGOOD COMPANY, Marion, Ohio





for MARTIN WUNDERLICH CO. — OKI CONSTRUCTION CO. Third Lock Project Gatun, Canal Zone.



for CADDOA CONSTRUCTORS (W. E. Callahan Construction Co.,—Gunther and Shirley Co.,—Rohl-Connolly Co.) John Martin Dam—Caddoa, Colo.

#### Model "L" Bottom-Dump EUCLID

CAPACITY—heaped: 22.7 cu. yds. struck: 18.0 cu. yds. payload: 28.0 tons 1TIRES—drive and trailer: 18.00 x 40 25.5 cu. yds. 30.0 tons 24.00 x 32

4LDT-63W 5LDT-71W 22.7 cu. yds. 26.5 cu. yds. 18.0 cu. yds. 21.0 cu. yds. 28.0 tons 30.0 tons 18.00 x 40 24.00 x 32 (Detailed information mailed on request)

POWER AND TRACTION: 200 h.p. diesel engine . . . fluid coupling . . . 8 speeds forward from 2 to 24 m.p.h. . . double-reduction full-floating EUCLID drive axle . . .

THE EUCLID ROAD MACHINERY CO. . CLEVELAND, OHIO



"I's" for WARNER CONSTRUCTION COMPANY.
Green Mountain Dam — Heeney, Colo.



18-"L's" for MARSCH — PETERSON — WALKER CONDON. Kanopolis Dam — Langley, Kano

SELF - POWERED EARTH . ROCK . COAL . ORE HAULING EQUIPMENT



# D-BOILED

"The TD-18 has proved itself unbeatable and second to none for all-around performance," says Foreman J. McHale of J. Booth, Inc., Carbondale, Pa. The Booth Company has b operating this crawler 12 to 15 hours a day for the last eight months, a total of 3600 hours, without a single breakdown



"Works fine," says the operator of this TD-6 Diesel, owned by A. J. Diana, Massilon, Ohio.

Shown here grading dirt to make a new lawn.

F YOU'RE HARD-BOILED about tractor operation, International Diesel TracTracTors are your logical choice. Here are four Dieselpowered crawlers that take the toughest dirt moving jobs in stride. They pull and push, carry and dump, with sure-footed dependability. They're built from the ground up to weather the stresses and strains of heavy construction work. And through it all they keep maintenance and upkeep costs low.

Standardize on International Diesel Trac-TracTors. Get the benefit of these features: easy-starting full Diesel engines; replaceable cylinder sleeves; Tocco-hardened crankshafts; full-pressure engine lubrication; fast, easy gear shifting; wide speed range; positive track alignment; comfortable seat and convenient controls; individual unit accessibility; well located mounting pads for attaching balanced allied equipment; and many others.

Turn your tough jobs over to International TracTracTors. See the nearby International Industrial Power dealer or Company-owned branch for details. Find out, too, how the five new International Industrial Wheel Tractors will cut costs for you. They fit right into a wide variety of construction, maintenance, materials-handling, and transportation work.

INTERNATIONAL HARVESTER COMPANY Chicago, Illinois 180 North Michigan Avenue





Up hill, down hill—sure-footed power every inch of the way. This view shows the big six-cylinder International TD-18 Diesel with scraper. The TD-18's six-speed transmission permits adjusting tractor speed to the load for maximum efficiency on the job.

S NEW INTERNATIONAL Industrial WHEEL Tractors



This compact little tractor develops 29.5 engine h.p. at 1,650 r.p.m.



This middle-sized tractor develops 40.5 engine h.p. at 1,450 r.p.m.



Diesel economy in a "middleweight" model. Develops 38.5 engine h.p. at 1,450 r.p.m.



Lots of stamina built into this big tractor. Develops 54 engine h.p. at 1,500 r.p.m.



Big, powerful, economical. Develops 51.5 engine h.p. at 1,500 r.p.m.

Industrial Power



WHEN THE GOVERNMENT called for a speed-up in defense construction work, Uncle Sam's engineers called on timber.

Timber responded—answering the biggest emergency defense demand on record. The first batch of our citizen soldiers is now adequately housed. . . . As timber came to the aid of Uncle Sam, TECO Connectors

came to the aid of timber in helping to meet the emergency.

The TECO System of Construction makes it possible to utilize lumber quickly for many forms of building which demand standard mill fabrication and low cost material. TECO Connectors eliminate most of the bolts, plates and angles formerly used in heavy construction work, permitting a speed-up in building activity while adding structural strength to each building unit. With TECO Connectors, new building feats are being achieved constantly by timber in meeting at lower costs emer-

gency and industrial demands.

No builder, or prospective builder, for industrial expansion or emergency defense construction should be without full and complete information about this new and simple method for producing low-cost structures quickly. MAIL COUPON NOW!

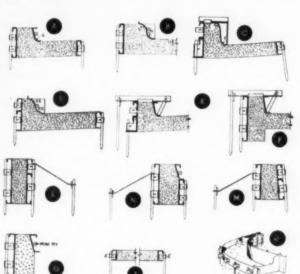
### Timber Engineering Company, Inc. Dept. M-5, 1337 Conn. Ave., Washington, D. C. Please send at once your new Free Booklet "Designing Timber Connector Structures". Individual CIN

### TIMBER ENGINEERING CO., Inc.

Dept. M-5, 1337 Connecticut Avenue Washington, D. C.

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# FAST...LOW COST (Universal) CONCRETE CURB From cantonments and modern defense building with miles of paving, to the occasional paving job, BLAW-KNOX STEEL FORMS give a high dollar return value to any contractor.



BLAW-KNOX CONSTRUCTION EQUIPMENT includes:
Bins & Batchers • Road Forms • Street Forms • Concrete Spreaders
Tamping Rollers • Vibrators • Concrete Buckets
Clamshell Buckets • Truck Mixers • Striping Machines • Turntables
Road Finishers • Steel Forms

Easy to handle and use, they will do street paving work quicker and cheaper. The steel imparts a smooth finish to the concrete, eliminating hand finishing.

Thousands of contractors use Blaw-Knox Steel Forms for a great variety of work. Any design of concrete curb; curb and gutter; integral curb; sidewalk, etc., can be handled with standard Blaw-Knox form set-ups.

Blaw-Knox Steel Forms are built for long service; quick installation and dismantling; and are rigidly braced to hold their position when being filled with concrete.

Always ready for action — to use again and again.

		-		
BLAW-KNOX		r Dlas	Knox	Company
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BI.AW-KNOA	DIVIDE R	ank Bldg.	, Pittsbur	gn, ra
5	086 Farmers D	Gire.		

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Company	
Individual	
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Address	City and State
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### gives you all these advantages FEED MECHANISMS Right - Closeup of spirally fluted feed roll. Hinged gate above roll adjusts thickness of spread. Gate automatically stops all flow when Spreader stops. BOTTOM VIEW Left-Showing under construction of Buckeye Spreader. Spirally fluted feed roll across entire width of box actually grips the material and discharges it positively and evenly at all times. It is chain and sprocket driven from the transmission at a speed bearing a constant relationship to the truck speed. This speed ratio can be varied to give best results for different materials by means of different size sprockets. Spreading is uniform regardless of truck speed. Hand crank provides easy, one-man control of adjustable truck hitch in center of back panel. (See Upper Left Arrow.) Hand lever for disengaging hitch shown to right of hitch. Fully enclosed transmission is shown at right of wheels—this provides direct drive from wheels to feed roll. Chain drive at left operates distributor. Skids or guards upon which spreader may be tipped can be seen at SCREW DISTRIBUTOR TRANSMISSION Left Circle-Wet sand and sim-Right Circle-The transmission ilar materials are kept moving runs in a dust and oil tight casproperly by a reversible spiral ing-it is precision-built for long

Left Circle—Wet sand and similar materials are kept moving properly by a reversible spiral distributor, easily inserted or removed from the spreader box. It carries material out to the ends of the box and assures an even distribution over the entire width of spread. Drive is from the wheel shaft, quickly disengaged by a simple throwout. Arrows trace distributor drive and controls and position of distributor.

Right Circle—The transmission runs in a dust and oil tight casing—it is precision-built for long trouble-free service. It is easily and instantly controlled by a hand lever and may be set in a neutral position to stop feeding action of the spread. Transmission is reversing to permit proper rotation of feed roll whether truck is moving forward or backward. Arrows trace transmission drive, controls and position of transmission.

#### TOP VIEW

Left—Looking down into Buckeye Spreader. Note arched hopper bottom. This directs material to the feed roll; provides a pocket for material at forward edge of spreader to provide counterbalance; and permits placing wheels well in from the ends of the machine to keep them off shoulders and to allow spreading close to roadside obstructions. Screw distributor is shown in pocket over feed roll.

### SPREADER



THE Buckeye Spreader construction features described on these pages will make money for you. They make possible an accuracy and uniformity of spread that saves time, labor and material; eliminates patching, brooming and raking; saves truck time and expense; and produces a better, longer-lasting road surface.

Buckeye Spreader owners report accuracy as high as 99%; savings in material of

as much as 50%; labor savings of 20% and more; dollar savings of \$32 per mile, \$1000 per job, \$50 per day and similar figures.

There's a Buckeye Spreader for every job — 9, 10, 11, 12 foot widths standard and 13 ft. on special order. Plan now to buy one or more Buckeye Spreaders for bigger profits this year. Write to Buckeye for 8 page Spreader Bulletin today.

BUCKEYE TRACTION DITCHER COMPANY, Findlay, Obio



### Built by Buckeye





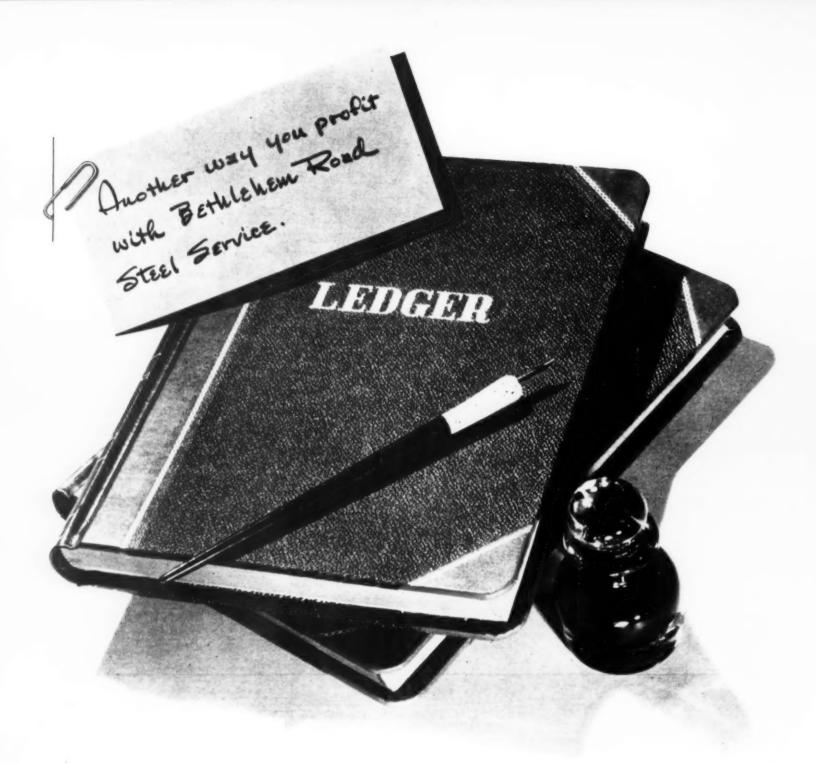








removed from spreader.



### You'll save bookkeeping!

You let yourself in for a lot of needless bookkeeping when you get your road steel from a number of different sources. It's needless because it can so easily be eliminated. How? Simply by ordering everything from one source—Bethlehem.

And that's only one of the ways you save by ordering the easy Bethlehem way. You cut down correspondence, phone calls. You get deliveries complete, when you want them, without having to waste time awaiting some key item that's delayed.

And in the bargain, you get a line of road steel that has proved itself time and again on big U. S. highway jobs.

Let one of Bethlehem's 15 strategically-located warehouses or many alert jobbers fill your road steel needs. For details of Road Steel Service and catalogs, get in touch with Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY



# Get 18 to 38% More Yardage from Your Present Tractors



Make More Money . . . Representation of the Modern LeTOURNEAU with Modern LeTOURNEAU Big-Capacity RU or W Carryalls

STEP up yardage this simple, money-making way—put big double-bucket RU Carryalls (30 heaped yards) or single-bucket W's (23 heaped yards) on your jobs. Both have the same 10-foot cutting edge as most older 12-yard models. You can load them in a hurry with a pusher. Your "Caterpillar" D8 tractors have plenty of power for hauling them.

In both RU and W you get the latest LeTourneau costcutting Carryall improvements: high bowl sides and big apron to increase capacity and hold in all the dirt you dig ... new arched "A" frame to strengthen construction and give you easier unloading ... all sheaves and cables operating out of the dirt to give you much lower cable cost.

for long Hauls use

Earthmovers from Singapore to Florida are using LeTourneau RU and W Carryalls to speed defense work. Here Kuckenberg Construction Co. gets heaping loads with a fleet of W's and "Caterpillar" D8 tractors, excavating for shipyards at Portland, Oregon.

#### GAIN 76 TO 154 EXTRA YARDS HOURLY

Most important, you get more yardage with the same tractor power. Take this typical case:

800-foot one-way haul, loading on level, using 4 "Caterpillar" D8 tractors

Carryalis	Hourly Yardage per Unit	Hourly Yardage for Fleet	Increase per Hour
4 12-yards	97	388	
3 W's with pusher	154	462	18%— 76 yds
3 RU's with pusher	197	591	38%—154 yds

On a 10,000-hour life, that's 760,000 extra yards with 3 W's...or 1,540,000 with 3 RU's...and no increase in

tractors or man-power! Figure the extra profit at your own bid prices. Then ask your LeTourneau-"Caterpillar" distributor to order RU's or W's for you NOW.





You can extend Carryall profits to hauls beyond tractorscraper range just as Coke & Braden, Texas contractors, did here with their "Caterpillar"-powered Tournapulls. On a 2800-foot round trip they moved 3500 cu. yds. of gravelly clay and loam per 12-hour day with 3 Model C Tournapulls and LS (11 heaped yards) Carryalls. Gor Lowest Net Cost Per Yard—ANGLEDOZERS\*, CARRYALL\* SCRAPERS, BULLDOZERS, ROOTERS\*, PUSHDOZERS, POWER CONTROL UNITS, SHEEP'S FOOT ROLLERS, TOURNAPULLS\*, CRANES, TOURNATRAILERS\*, TOURNACRANE. \*Name Reg. U. S. Pat. Off.

# How often do you make money out of dawdling?



Every contractor knows that, 99 times out of 100, the quicker a job is completed the more money he makes. That is why he is anxious to use any reliable shortcut to the "finish line."

As proved on job after job, one of his most reliable shortcuts is Lehigh Early Strength Cement. Producing service-strength concrete in one-third to one-fifth the usual time, it does one or more of these good things on every job it serves:

SHORTENS CONSTRUCTION TIME • REDUCES OVERHEAD EXPENSE • CUTS FORM COSTS • SPEEDS UP WORK OF OTHER TRADES • CO-ORDINATES SCHEDULES TOWARD CONTINUOUS OPERATION • HELPS AVOID PENALTIES • HELPS EARN BONUSES.

Shown here are three typical cases of Lehigh Early Strength Cement affecting profit in the right way. It is *the* cement to use when timesaving means lower costs, or when, for any reason, quicker completion is wanted.

TUSCARORA MT. TUNNEL, PENNSYLVANIA TURNPIKE. Contractor, B. Perini & Sons, Inc., Framingham, Mass. Quick-curing concrete in ceiling—where 1600 lb, strength before form removal was demanded—allowed forms to be stripped in 10 hours. This gave a pour a day, speeded up construction cycle, reduced overhead cost, helped avoid \$500-a-day penalty.





LAFAYETTE BLDG., WASHINGTON, D. C. Contractors, Thompson-Starrett Co., N. Y. Concrete Contractors, Senn-Herrick Corp., N. Y. Quick occupancy suddenly desirable. Quick-curing concrete in floors permitted form removal in 4 days instead of expected 14 to 21; cut sub-freezing heat protection costs more than half. From steel skeleton to status in above photo, 8 weeks.



FOUNDRY EXTENSION, THE BULLARD CO., BRIDGEPORT, CONN. Contractor, Turner Construction Co., N. Y. A defense project demanding speed. 14" thick slabs of quick-curing concrete were ready for steel erection in 1 to 3 days instead of three to five times longer. Much of the shoring usually needed by marshy ground was eliminated entirely.

### Lehigh EARLY STRENGTH CEMENT

for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY . ALLENTOWN, PA. . CHICAGO, ILL. . SPOKANE, WASH.





When America decided to dig in, her first demand was for cantonments, enlarged factory capacities, airports and air and naval repair bases. Without these fundamental things she could not train her men, build their weapons or sustain her new power.

A dirt-moving job, this all-important preliminary work for the defense of this country! An emergency call for rock-busting, volumeboosting, dirt-moving power and for men to wield that power against time and weather!

"Caterpillar" Diesel power in tractors, engines and road machinery, which was already at work building those things worth fighting for, was ready to create the means with which they could be protected. And while most of the nation groans under an overload, these machines and the men that own them are pitching in on basic defense projects without breaking their stride.

The yardage being moved in this country today would be looked upon as a miracle in any other country in the world. America is really digging in . . . and digging with the tools which have made her famous and which will assure her continued security.

The extension of the defense program places heavy demands on the men in the dirt-moving industry and on the manufacturers who furnish them with the tools for this necessary work . . . big things have been done, big things have yet to be done.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

### CATERPILLAR DIESEL

ENGINES AND ELECTRIC SETS . TRACK-TYPE TRACTORS . ROAD MACHINERY

# DIGS IN





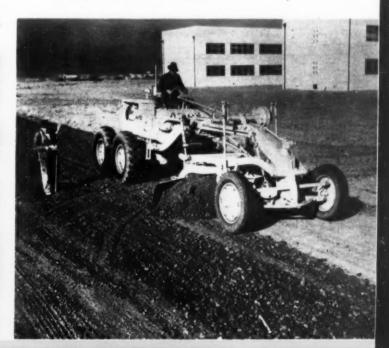


AT LEFT • Whipping winter's worst conditions to expand the Glenn L. Martin Company's plane plant.

**ABOYE** • Jack-hammers powder rock as "Caterpillar" Diesel Engines drive compressors.

LOWER LEFT • Huge scraper-units hasten the building of California's Camp Callan.

**DELOW** • An air station will have fast roads, smooth runways, because of this machine.



This Excavation Job was . . another example of "BETTER BLASTING" with ATLAS EXPLOSIVES

Shovel working in the 90' cut. Note good breakage despite irregular formation.

Drilling was difficult across bedding planes and joints at high angle.

A road job with 95% of the excavation rock is sweet music for the explosives sales Representative—but it usually means that close cooperation is necessary between the explosives representative and the contractor before a profit can be shown.

And when the rock is heavily folded sandstone and conglomerate that is somewhat fractured, a real drilling and blasting problem is presented.

That was the situation that faced D. A. Kessler Construction Co., Mt. Carmel, Pa., in relocating 1.54 miles of state highway between Tamaqua and Hometown, Pa.

Atlas explosives and modern blasting methods helped to satisfactorily finish the job well ahead of schedule.

This is but one example of how Atlas is cooperating to solve construction problems throughout the country. Ask your Atlas representative.



A completed cut



**EXPLOSIVES** "Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco



BENDING around sheaves, or dragging through corrosive ground water, every wire in every strand of this wire rope is free to move ... alive ... fully protected against wear, weather, rust and corrosion.

Operators everywhere get longer service, safer service, from their wire rope by giving it this protection with Texaco Crater. Texaco Crater penetrates to the core of wire rope, embedding each individual wire in a tough, viscous film that clings, despite heat, cold, rain, hard usage.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has also made it preferred on many of the larger construction jobs throughout the country.

These Texaco users enjoy benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate. Phone the nearest of more than 2300 distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

CRATER BOOKLET—32 pages of practical information on open gear and wire rope protection. A copy is yours for the asking.



Texaco Dealers invite you to enjoy FRED ALLEN in a full-hour program every Wednesday night. CBS, 9:00 E.D.T., 8:00 E.D.T., 7:00 C.S.T.; 9:00 M.S.T.; 8:00 P.S.T. CARDIN Mining and Milling Co., Picher, Okla., lubricates shovels and trucks 100% with Texaco. Open gears and wire rope protected with Texaco Crater.

#### THEY PREFER TEXACO

- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
- ★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.
- ★ More locomotives and cars in the U.S. are lubricated with Texaco than with any other brand.
- ★ More tourists use Texaco Fire-Chief Gasoline than any other brand.
- ★ More revenue airline miles within the U. S. are flown with Texaco than with any other brand.
- ★ More buses, more bus lines and more busmiles are lubricated with Texaco than with any other brand.



TEXACO Lubricants and Fuels

TO CUT ROPE COST...

# KEEP YOUR EYE ON THE ROEBLING 4

PROFIT FROM

IN ROEBLING ROPE

IN ROEBLING ROPE

1 UNUSUAL ORGANIZATION

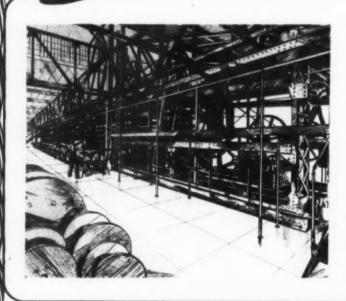
2 EXCEPTIONAL FACILITIES

3 AGGRESSIVE RESEARCH

4 100 YEARS EXPERIENCE

The Roebling "4" combine to give you the one thing above all that counts in wire rope service. And that is — utmost overall rope safety and minimum general average rope operating cost — economy based on your ropes as a whole.

ROEBLING
"Blue Center"
WIRE ROPE



### WIRE ROPE HIDES NO SECRETS HERE!

This wire rope fatigue machine is an outstanding example of Roebling's aggressive research and exceptional facilities. It is the largest and most highly developed wire rope fatigue machine in existence, designed by Roebling for use in studying rope characteristics. With this machine is carried on a never-

ending search into the wearing and fatigue qualities of wire rope under various bending and tension conditions.

JOHN A ROEBLING'S SONS COMPANY

TRENTON

Branches in Principal Cities Export Division '9 Perstor St. New York N.Y. U.S.A. Cable Address "Roebling's", New York



The One and Only

Speed-o-Matic

CONTROL

"300" SERIES 11/2-2 CU. YD.

### LINK-BELT SPEEDER

SHOVELS-DRAGLINES CRANES

□P TO 30%
 GREATER
 OUTPUT

☆LONG LIFE, TROUBLE-FREE PERFORMANCE

LOWER MAINTENANCE

### OF COURSE-

the initial cost of a Link-Belt Speeder "Speed-o-Matic" shovelcrane is higher. You would expect that of a machine that enables you to do more work at less cost and operating expense.

Only Link-Belt Speeder gives you Speed-o-Matic Power-Hydraulic Control and clutches—smooth, easy and fast operation. To use the words of operator Lawrence Fowle of Laconia, N. H.: "Never in my fourteen years experience of running shovels have I ever seen anything like Link-Belt Speeder Speed-o-Matic control. It produces 30% more work with 60% less work for the operator."

Find out for yourself why and how you can increase your production and lower your operating costs with Link-Belt Speeder Speed-o-Matic shovels-draglines-cranes. Write for book 1889. 8530

### LINK-BELT SPEEDER CORPORATION

Builders of the Most Complete Line of Shovels and Cranes
301 WEST PERSHING ROAD • CHICAGO, ILLINOIS



ABOVE: Heavy-Duty Heil Dump Units operating at the Island of Trinidad: BELOW: Heil Hydraulic Bulldozer and Model FD Cletrac at Mobile Airport. BOTTOM: Part of the fleet of Heil Cable Scoops building the Mobile Airport.



DOWN AT MOBILE, ALA., a fleet of 13½ yard Heil Twin-Cable Scoops and a Heil Bulldozer are clearing ground, scooping up stumps, and biting up 400,000 yards of dirt to build an airport—not just an ordinary airport, but the world's largest municipal airport—791 acres of it.

Heil Twin-Cable Scoops, built in seven sizes from 6 to 24 cubic yards, have the speed, flexibility, and stamina for profitable operation on long or short hauls. The lever action of the jack-arm for raising the bowl and of the lifting arm for pushing out the load reduces the pull on the cables and insures longer cable life.

It will pay you to investigate the EXTRA profit features of Heil Earth Moving Equipment. Write, wire or phone TODAY for complete facts.

THE HURLED

MILWAUKEE, WISCONSIN . HILLSIDE, NEW JERSEY





THE new Shell Rudis Oil is tough. It's been tested in the laboratory, in test engines and in the field, under the most severe operating conditions. It has met every test, with flying colors!

These exhaustive tests, made by competent, independent engine authorities,

- I Has high oxidation stability under the most severe temperature conditions.
- 2—Keeps rings and pistons free.
- 3—Is non-corrosive to bearing metals.

m

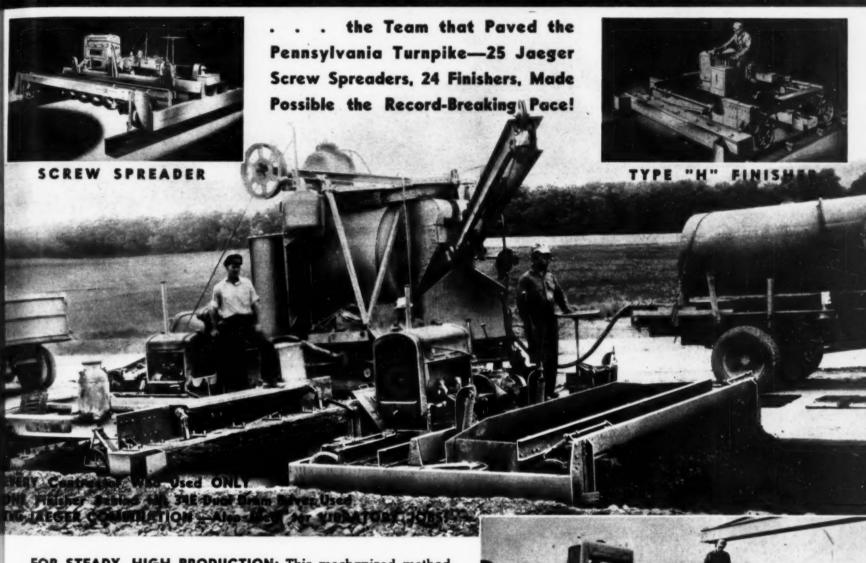
- 4-Reduces sludge formation.
- 5-Cuts down engine wear.

Test Shell Rudis Oil yourself-and save!

NEW SHELL RUDIS OIL FOR HEAVY

# Now You Can PAVE as Fast as You Can POUR — THIS JAEGER TEAM

LAYS ALL THE CONCRETE A 34E DUAL DRUM PAVER CAN PRODUCE — ANY STANDARD WIDTH — CUTS COSTS BEHIND ANY PAVER, LARGE OR SMALL



FOR STEADY, HIGH PRODUCTION: This mechanized method, originated by Jaeger, knocks the "bottleneck" from paving schedules—has remixed, spread, struck off and finished as high as 274 lineal ft. per hour of reinforced 12 ft. slab, 9" thick, and up to 410 ft. where two Pavers, Spreaders and Finishers operated simultaneously in one lane. Harsh, vibratory mixes are no problem. You can gear production to the capacity of your paving plant.

FOR UNIFORM TEXTURE OF SLAB: Jaeger is the only Spreader equipped with Screw which positively re-mixes and densifies the material and spreads it well against forms. No stone pockets, none of the segregation of hand shoveling, minimum honeycomb, and density of slab approaching vibrated concrete, even without vibration.

FOR LOWER COSTS: In addition to increased production, one man, with Spreader, does work of crew in pit and does all work of striking off in front of Finisher. Finishing machine concentrates on producing smoother finish, saving on floating and final finishing costs. Ask for latest catalog giving full details.

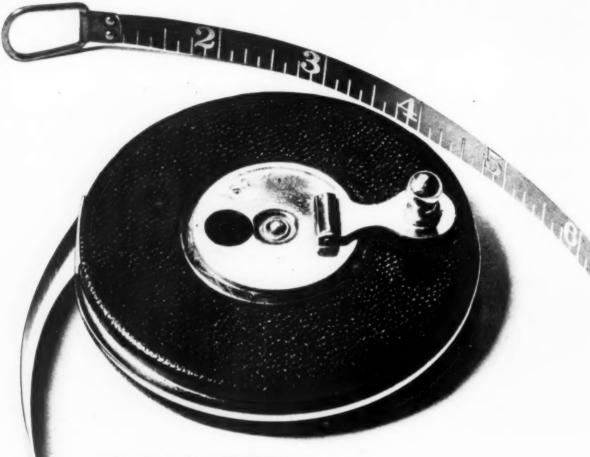
THE JAEGER MACHINE COMPANY
800 DUBLIN AVENUE COLUMBUS, OHIO

ORLD'S LARGEST MANUFACTURERS OF SPREADING, FINISHING QUIPMENT (Concrete, Bituminous)—MIXERS, PUMPS, HOISTS, TOWERS



ON WIDER SLAB: Above shows 22-22 Ft. Spreader behind 34E Dual Drum Paver Operating at 70 Batches per Hour. W. L. Thon, Contractor, on Michigan Route 66. Below: Type "H" Finisher behind 34E Dual Drum Paver, averaging 1/2 mile of 24 ft. Slab per 8 Hrs. on "Road to Tara," South of Atlanta, Ga.; Hardaway Contracting Company.





# WHAT! SIXTEEN INCHES TO THE FOOT?

WICKWIRE ROPE You'd say it was the greatest buy in the wire rope market.

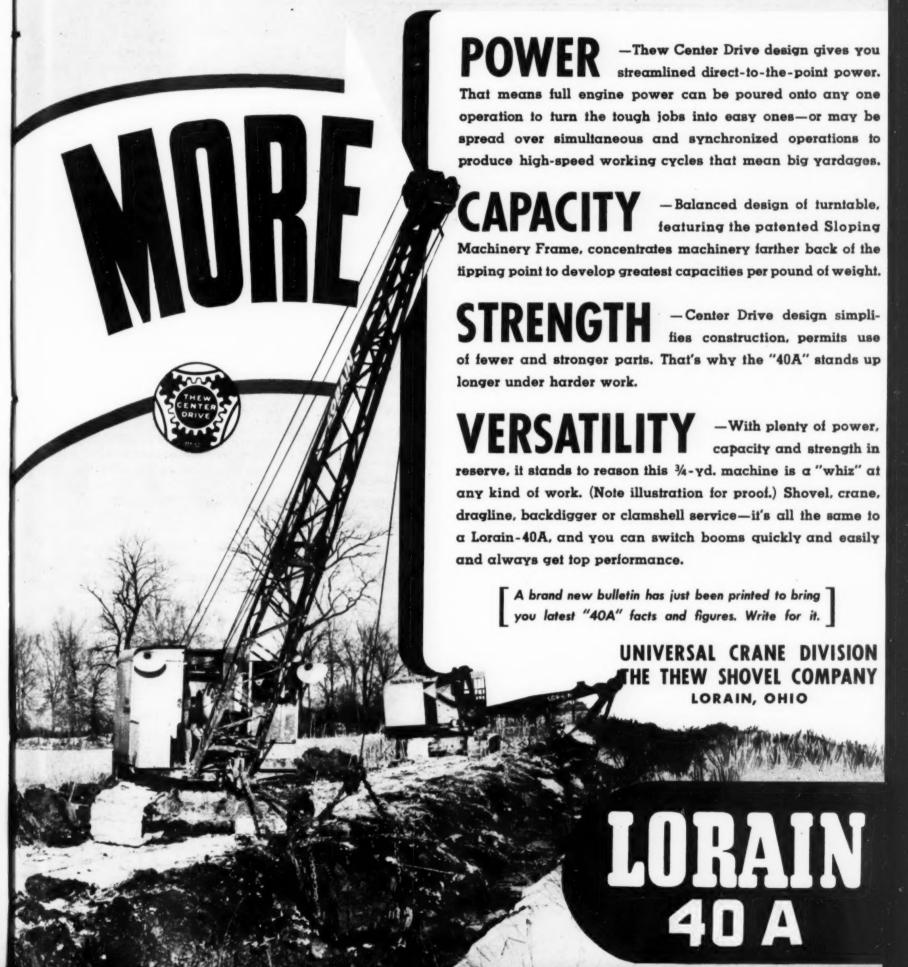
When you measure the service that every twelve inches of Wickwire Rope gives the user in comparison with accepted standards, you find Wickwire offers sixteen, eighteen, yes and twenty-four inches and more in value for every twelve inches of rope you pay for.

Why?... Wickwire Spencer has never been satisfied that standard specifications are the goal of quality. Better metallurgy, more careful manufacture, honest recommendations as to construction to suit the use and valuable information as to care of rope have all contributed in giving Wickwire Rope longer life. Specify Wickwire Rope the next time you order.

### WICKWIRE SPENCER STEEL COMPANY

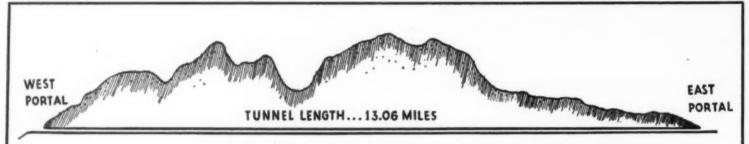
General Offices: 500 Fifth Avenue, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

# 1 3/4 YD. MACHINE has MORE of EVERYTHING YOU NEED



### **DUPONT EXPLOSIVES**

### help drive the new Continental Divide Tunnel



Under the mountains from the east and west sides, men are working day and night to construct this tunnel, which is reported to be the longest one ever attempted without shafts. When completed, it will be circular in section,  $9\frac{3}{4}$  feet in diameter, with a gradient of  $8\frac{1}{3}$  feet per mile.



**BELOW:** The east portal of the tunnel. **BELOW:** The heading of the tunnel, after loading and wiring operations are completed and ready for the blast.



Listen to "Cavalcade of America"... presented by Du Pont every Monday evening over coast-to-coast NBC Red Network

#### Probably longest tunnel ever attempted without shafts

THE PROBLEM: Just east of the Rockies lies an area capable of raising a \$31,000,000 annual crop, plus a good income from livestock. But this can only be accomplished with abundant moisture, and the nearest adequate water supply is on the other side of the Rockies.

THE ANSWER: The new Continental Divide Tunnel, which will divert water from the western side of the Rockies to the eastern.

Boring thirteen miles of solid rock under the Continental Divide, this tunnel will be probably the longest ever attempted without shafts . . . a major engineering project supplying water to irrigate a huge area, and to generate electric power.

The eastern sections of the tunnel are being driven by S. S. Magoffin, Inc., Englewood, Colorado. Platt-Rogers, Inc., Pueblo, Colorado, has the contract for a western section. To both of these wellknown firms, Du Pont extends congratulations for the swift, smooth progress already made.

GELEX was specified because this increasingly popular dynamite offers economy combined with utmost efficiency. GELEX is semigelatinous, plastic and cohesive. Its high velocity gives excellent fragmentation, helps speed mucking out. Its minimum fumes permit a quicker return to the working face. And its good water resistance means that this economical explosive may often be used in place of the more expensive gelatins.

Du Pont All-Metal Delay Electric Blasting Caps were selected because of their *proved* dependability of performance.

If you have a blasting problem, Du Pont stands ready to help you. By supplying you promptly with proved explosives and giving technical assistance, we help you do the job in the shortest time at the lowest cost.

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Explosives Department Wilmington, Delaware





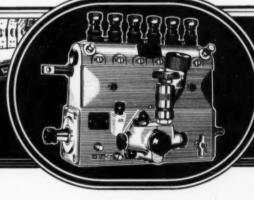


WHY do the majority of Diesel engine manufacturers depend on American Bosch Fuel Injection Equipment?

Uniform high quality . . . large production capacity . . . a wide range of types and sizes . . . extensive research facilities . . . the greatest of experience . . . outstanding performance in the field . . . a widespread service organization.

These are the principal reasons for the choice of American Bosch. But another factor is our genuine interest in the problems of the manufacturers of Diesel-powered equipment—problems which we willingly shoulder in recognition of our responsibility to the Diesel industry... just as we have established a Fuel Injection Equipment School open to anyone connected with the construction, maintenance or operation of Diesel engines.

AMERICAN BOSCH CORPORATION SPRINGFIELD, MASSACHUSETTS



AMERICAN BOSCH

Fuel Injection (STANDARD WORLD WIRD)

Equipment

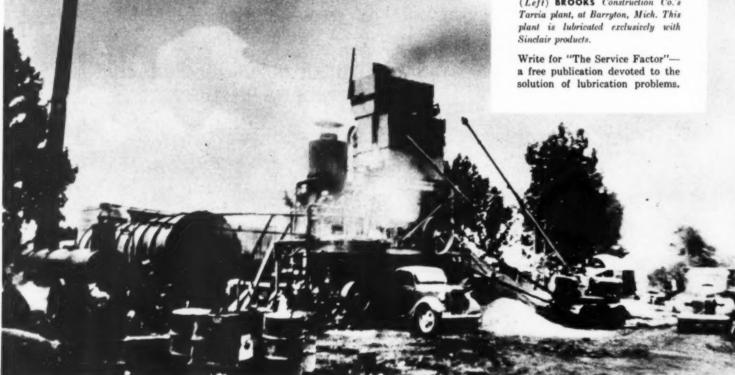
#### NATIONAL DEFENSE

pressure is taxing the full service capacity of all types of industrial equipment. Correct lubrication removes the menace of early breakdown. For road construction and earth moving machinery there are ...



SINCLAIR OILS and GREASES developed to meet the requirements of equipment pushed to continuous operation under the toughest service conditions. These products promote sustained peak output at low lubricating cost, and fewer layoffs for overhaul. For prompt delivery or for lubrication counsel, call the nearest Sinclair office or write Sinclair Refining Company, 630 Fifth Avenue, New York, New York.

(Left) BROOKS Construction Co.'s



### INCLAIR LUBRICANTS-FUELS

SINCLAIR REFINING COMPANY (Inc.)

2540 WEST CERMAK ROAD CHICAGO

10 WEST 51ST STREET NEW YORK CITY

1907 GRAND AVENUE KANSAS CITY

573 WEST PEACHTREE STREET ATLANTA

FAIR BUILDING FT. WORTH

### Goodbye WATER PROBLEMS

HERE'S THE WORLD'S MOST COMPLETE LINE OF CONTRACTORS' PUMPS - DESIGNED TO HANDLE WATER AT LOWEST COST TO YOU!



### MORE for Your Money! JAEGER, ALONE, GIVES YOU ALL THESE PUMPING FEATURES:

- UP TO 5 TIMES FASTER PRIMING with Jaeger "Priming Jet" No adjustments, no need to "gun"
- POSITIVE RE-CIRCULATION CUT-OFF - controlled by flow, not
- FULL-RANGE IMPELLER for high efficiency under all conditions (all-steel in 4" to 8" sizes).
- LONG-LIFE SEAL—accessible for
- SELF-CLEANING SHELL nonclogging, accessible.
- THOUSANDS OF EXTRA HOURS OF SERVICE - result of higher type construction.
- INDIVIDUALLY TESTED—for capacity and pressure before leaving factory.

### And You Get All These Advantages in a Pump EXACTLY SUITED TO YOUR JOB!

Contractors use more Jaeger "Sure Primes" than any other pump in the world - because Jaeger gave them the modern self-priming centrifugal of small price and huge capacity — made it prime as much as 5 times faster, pump unfailingly, deliver far longer service — builds it in the only complete range of types, capacities and prices — and backs it with stocks and service within 2 hours of almost any place your job may be. Get our complete catalog and prices. The pump you want is there.

THE JAEGER MACHINE CO., 800 DUBLIN AVENUE, COLUMBUS, OHIO

SURE-PRIME" PUMPS

MIXERS 31/2 TO 56S — HOISTS 6 TO 100 H. P. — TOWERS 30 TO 500 FT. CONCRETE AND BITUMINOUS PAVING EQUIPMENT - TRUCK MIXERS

# Thanks to TWO KINDS OF WIRE IN MONARCH PREFORMED

...You Buy LESS Rope...You Use It LONGER

...You Have FEWER Shutdowns

#### "INNER WIRES ARE EXTREMELY FLEXIBLE"

They are improved plow steel. They're drawn in a special way to make them extra strong and EXTREMELY PLIABLE. They bend over sheaves and drums easily, constantly ward off internal fatigue. These wires in Monarch Whyte Strand give the rope great reserve strength, long life.



Every one is improved plow steel specially drawn for outside service. Wherever you put 'em to work...on shovels, cranes, drag-lines, scrapers ... THESE wires can take it. They're the rope's first line of defense against corrosion, abuse and abrasion. They won't give up quickly.

Then, between and around every wire, is a specially formulated Macwhyte lubricant that guards those unseen, inside wires. No bearing surface is left uncovered. All are cushioned against abrasion, friction and corrosion by the finest lubricant available. Ask your distributor about Monarch Whyte Strand PREformed.

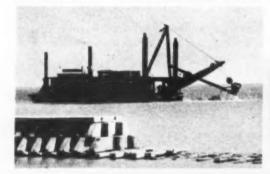


2941 Fourteenth Ave., Kenoshu, Wisconsin Manusacturers of rope wire-lest-&-right lay braided slings — Stainless Steel wire rope — Aircrast cable, Aircrast tie rods, and "Sase-Lock" Swaged Terminals — and wire rope to meet every need.

New York • Chicago • Pittsburgh • Ft. Worth Portland • Seattle • San Francisco Distributors throughout the U. S. A.











MACWHYTE
EXCAVATOR ROPES
The correct ropes for your equipment



PRE-FORMED FOR BEST PERFORMANCE

### DEFENSE WORK PUSHED AHEAD 13 days

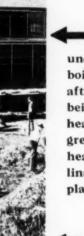
How contractor speeded work and cut plant and overhead costs about 50% on new building for a machine-tool company



HE essential machine-tool industry needs more working room in a hurry. These pictures show how the contractor reduced his plant and overhead costs approximately 50% while jumping production ahead almost two weeks on construction for the Monarch Machine Tool Co., Sidney, Ohio.



The subgrade was covered with heavy paper and a thick layer of straw to protect the ground from wet or freezing weather, and to keep it ready for placement of concrete regardless of weather.



Everything moving at once! In the background, Atlas High-Early concrete is being protected and cured under tarpaulins on movable frames. Two 20-h.p. steam boilers provided heat to keep the concrete at 70° for 24 hours after placement. In the center, Atlas High-Early concrete is being placed. The steam boilers, in addition to providing heat for curing, heated the mixing water. Measured aggregates were delivered to the mixer in batches from heated bins. When this section was finished, the tarpaulins in the background were moved up while concrete was placed in the foreground.



Concreting completed 13 days ahead of originally scheduled date. This permitted moving ahead other building operations an equivalent length of time. The picture shows part of the steel frame in place with work about to begin on the walls.

Whenever speed in construction is essential, specify Atlas High-Early cement. It gains working strength rapidly-cuts protection and curing time and costs, and often permits earlier stripping and re-use of forms. But most important, Atlas High-Early produces ser-

viceable concrete in much less than the usual time. Write to Universal Atlas Cement Co. (United States Steel Corp. Subsidiary), Chrysler Bldg., N. Y. C.

OFFICES: New York, Chicago, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth,

St. Louis, Kansas City, Des Moines: Birmingham, Waco. Monarch Machine Tool Co., Sidney, Ohio. Contractor, M. C. Ferguson, Sidney, Ohio; Architect, Schenk & Williams, Dayton, Ohio.



# You get the same Pand I inall Is



Haulers say their GMCs are the greatest performers and the toughest vehicles they ever owned. In side-by-side comparisons, these stronger trucks come out ahead on every count! They accelerate quicker! They climb stiff grades faster! They work all day at a pace that would tear the heart out of an ordinary truck. GMC research

and engineering make the difference. In General Motors Trucks, you get the industry's strongest-pulling engines, size for size. You get proved construction in every chassis detail—roomier Rider-Ease Cabs, GMC's exclusive Cradle-Coil Seats and Ball-Bearing Steering that gives you real "passenger-car handling ease."



Our own YMAC Time Payment Plan assures you of lowest available rates

GMC TRUCKS
GASOLINE DIESEL



is important, to meet specified high production schedules . . . when every second counts. Koehring Pavers with Autocycle operation save seconds from skip to bucket . . . cut production costs . . . increase your profit.

**KOEHRING CO • Milwaukee, Wis.** 

Koehring Two Door distributing bucket . . . doors open same direction across full width of bottom . . . Harsh or dry concrete dumped instantaneously.

HEAVY-DUTY CONSTRUCTION EQUIPMEN



**READY FOR SUMMER JOBS:** 

### TWO GREAT NEW **BIG** OFF-THE-ROAD TIRES

TOUGHER! LONGER-WEARING! MORE TRACTION!



#### The new Goodyear ALL-WEATHER

EARTH MOVER TIRE

Peer of all earth-moving tires. Rubber in tread and sidewalls is 40% heavier for longer wear, greater protection against cutting. New tread design extending over shoulders to center sidewalls gives side traction, prevents side-slip on grades. Wide, smooth-rounded tread channels shed stones — won't trap dirt. Greater bruise and fatigue resistance from new high-tensile cord carcass construction with equal load distribution on all plies. Full flotation — built to maximum cross section. Strongest beads ever built armor tire against rim-cutting and chafing. Available in most popular sizes of Earth Mover tires.

#### The new Goodyear SURE-GRIP

GRADER TIRE

Most powerful mud tire ever built. 20% to 50% more forward traction in mud and snow by actual test — excellent reverse traction — from new massive stud-bar tread. Open center design with wide channels insures positive self-cleaning. Up to 40% more rubber in tread and sidewalls for longer wear. New extra-wide 4-breaker unit armors shoulders against cutting. Greater bruise resistance from new high-tensile cord carcass — 10% to 12% stronger than any previous cord. Improved non-rocking beads carry heaviest loads without chafing or deflection. Available in popular sizes for graders and maintainers.

GOODY EAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

## Construction Methods

ROBERT K. TOMLIN, Editor

Volume 23

MAY, 1941

Number 5



GETTING READY TO ERECT TENT. Aluminum ribs are first laid on ground, then bolted together and hoisted with ropes into position to carry tabric forming cover of tent.



**HUGE ALUMINUM RIBS** of General Motors "Aer-O-Dome" are in place and canvas fabric covering, impregnated with aluminum powder to give it a silvery sheen, is ready to be raised.



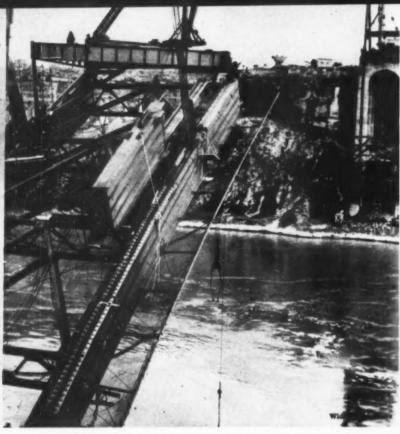
CANVAS COVERING for "Aer-O-Dome" of Parade of Progress is hoisted by ropes and pulleys.



**READY FOR CUSTOMERS!** Portable auditorium has been set up in football field and is ready to receive visitors. Spot lights turned on dome at night give it appearance of shining metal object.

## Aluminum Ribs Form Framework For Mobile Tent

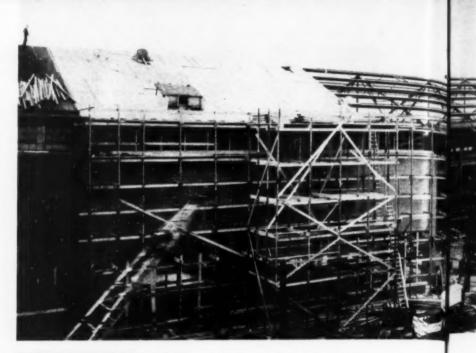
DESIGNED FOR SPEEDY ERECTION and disassembly, lightweight ribs of aluminum alloy form the framework for a traveling "tent" to house a mobile research exhibit that will be staged in various cities by the General Motors Corp. as a Parade of Progress to demonstrate how research aids national defense and vitalizes industry. Having a capacity of 1,500 persons, the movable auditorium, called the Aer-O-Dome, is 152 ft. long, 80 ft. wide and 26 ft. high, inside dimensions. The framework supports a fabric covering impregnated with aluminum powder to give it a metallic sheen. The design eliminates all interior (Continued on page 108)

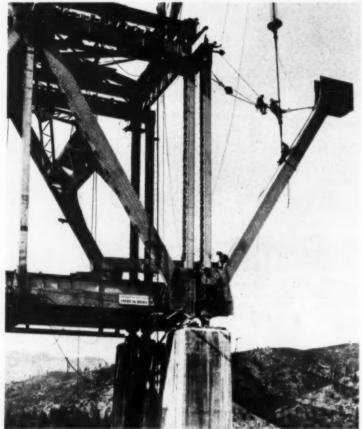


RAINBOW BRIDGE at Niagara Falls, N. Y. is extended as cantilever across Niagara River gorge to replace former "Honeymoon" bridge, destroyed by ice in 1938. Plans for \$4,500,000 structure, with a total length of 1,450 ft., including 950-ft. steel arch span, were prepared by Edward P. Lupter Corp., of Buffalo, in cooperation with Waddell & Hardesty, consulting engineers, of New York. For erection of steel superstructure Bethlehem Steel Co. has \$1.452,000 contract. Other contractors on project include McLain Construction Co., of Buffalo (American approach); Cameron & Phin, of Welland, Ont. (Canadian approach); and Aiken & McLachlan, of St. Catharines, Ont. (Canadian abutment).

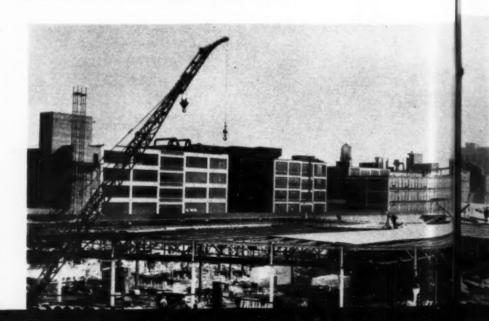
# THIS MONTH'S NEWS BEEL

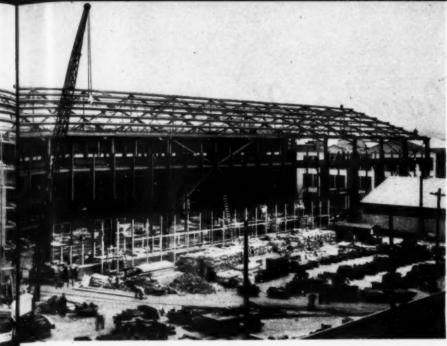






ANOTHER BIG STEEL MEMBER goes up on Pit River double-deck bridge, being erected by American Bridge Co. for U. S. Bureau of Reclamation in connection with relocation of highway and railroad routes around reservoir to be created by Shasta dam, in California. Heavy diagonal shown in picture is 65 ft. long. Bridge, with 650-ft. cantilever span, will require total of 17,110 tons of structural steel. Safety net protects steel workers on structure 500 ft. high above river level.





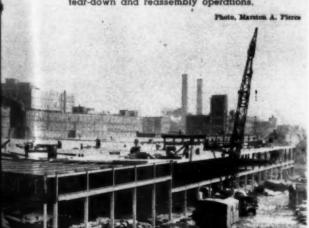
TO HANDLE DEFENSE ORDERS, extension involving 560 tons of steel is made to turbine shop of General Electric Co., at Lynn, Mass. Building is part of recently announced \$11,500,000 program expanding G.E.'s facilities for producing land turbines for utilities and industrials and marine propulsion equipment for Navy Department.

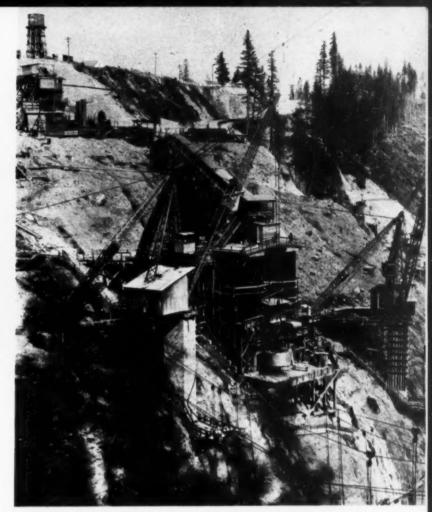


AT CAMP SHELBY, in Mississippi, \$1,800,000 hospital unit providing 2,000 beds, is built on 80-acre tract. Buildings are of wood-frame construction on concrete piers. All buildings are connected by passageways, including 2,600 lin.ft. of covered open walkway and 10,840 lin.ft. of inclosed walkway.

U. S. Army Air Corps Photo

THIRD AND LAST UNIT (below) is constructed at Packard Motor Co. plant in Detroit to provide facilities for manufacture of Rolls-Royce aircraft engines. Structure illustrated is for engine test, tear-down and reassembly operations.





HUNG ON CANYON WALLS is drying plant of Guy F. Atkinson Co., contractor, for preparing impervious core material for earth and rock fill at Mud Mountain dam, 425 ft. high, on White River near Enumclaw, Wash. To control moisture content of fill, plant is equipped with three large rotary driers, supplemented by screens and belt conveyors. Dried material is lowered to place in 8-cu.yd. buckets, handled by stiff-leg derricks. Site of dam is covered by huge canvas tent for which cable supports appear at bottom of picture.

Photo, Richard C. Barrett

SANTEE DAM SPILLWAY (below) on \$41,000,000 Santee-Cooper power and navigation project of South Carolina Public Service Authority, Charleston, S. C., approaches completion as McCarthy Improvement Co., Davenport, Iowa, under \$3,100,000 contract, pushes construction of reinforced-concrete piers for 62 tainter gates, each 50 ft. long by 12 ft. high, to be installed by Virginia Bridge Co. Santee dam diverts Santee River water to Pinopolis reservoir on Cooper River watershed; electric power will be generated at Pinopolis, starting in October of this year, and navigation channel to upper end of Santee reservoir, 110 mi. above Charleston, will be ready for service before end of year. Harza Engineering Co., Chicago, is in charge of engineering.



### \$86,000,000 Powder Plant

## Matures in 10 Months Under Drive by 23,000 Construction Workers

By VINCENT B. SMITH

Associate Editor

Construction Methods

ALMOST DOUBLING the construction quantities of the Radford (Va.) Ordnance Works described and illustrated in Construction Methods last month, the \$86,000,000 Charlestown smokeless powder plant of the Indiana Ordnance Works is driving ahead under the direction of E. I. du Pont de Nemours & Co., contractor, and of Army Ordnance officers, representing the War Depart-ment, to meet an identical 10-month schedule calling for initial operation to begin by May 17. In general, the plant is a double-size duplicate of the Radford works, essential powder-making processes being the same for both plants, although Charlestown does present noticeable structural differences which distinguish du Pont from Hercules design. The structural disparities and a varied approach to construction problems account for differences in methods to which the accompanying photographs call attention.

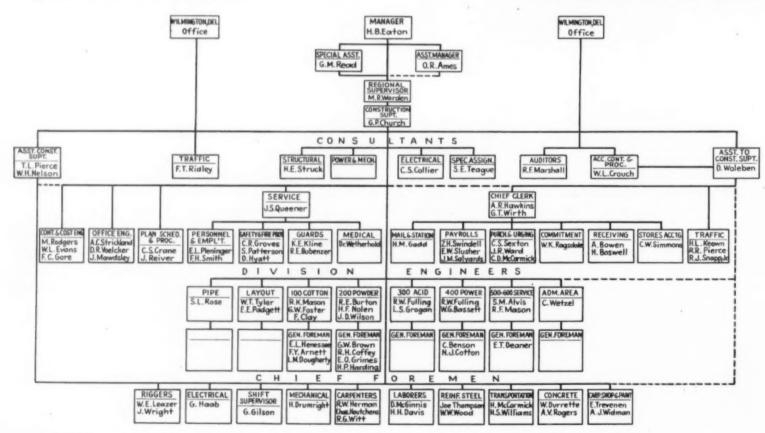
Skeleton statistics tabulated else-

1...
Plant Site and
Job Organization

where on these pages give an abbreviated summary of work accomplished to Jan. 25, or 20 weeks after breaking of ground, when construction was roughly 50 per cent completed. A chart shows how the construction force employed by du Pont and its subcontractors had grown in that time to more than 20,000, divided among three 8-hr. shifts in the proportions indicated by the tabulated data. The field army on Jan. 25 was well along toward the establishment of a new safety record which, by midnight of Feb. 20, had attained a mark of more than 3,650,000 man-hours worked without a single lost-time accident, a new high for construction safety in the United States.

#### **Plant Site**

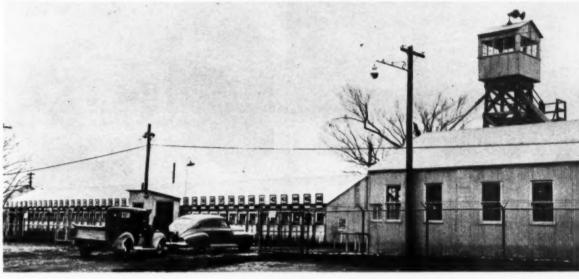
Laid out in a fenced area of about 2,700 acres comprising roughly one-half of a 5,400-acre tract on the Indiana side of the Ohio River 17 mi. northeast of



ORGANIZATION of du Pont engineering department for construction of Indiana Ordnance Works, Charlestown, Ind., heads up in manager in Wilmington, Del., with resident construction superintendent in full charge of all operations at Charlestown.



GREEN CROSS on white background, symbol of safety department, marks hard fiber hats of safety inspectors.



ACCESS GATE (above) to Charlestown, Ind., powder plant during construction is manned by police guards stationed in small sentry house. Operator of car stopped at gate is opening rear trunk for inspection. Admission is by badge or pass. Beyond car are rows of clock alleys

through which workmen pass to punch time cards. At right is elevated observation post for police. Loudspeakers on observation tower are part of plant system for broadcasting warnings and announcements from central microphone.



**SMALL DRAFTING ROOM** in War Department wing of construction office building makes special drawings not provided by powder company.



**BLUEPRINT FILE** furnishes complete set of reference drawings for officers representing War Department on project.



TRAILER CAMPS in Charlestown, Ind., house hundreds of construction workers. Regional director appointed by state health department took charge of area in February to correct any dangerous sanitary conditions.

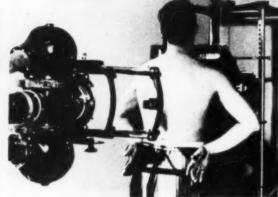


**EQUIPMENT DISTRIBUTOR** Roy C. Whayne of Louisville sets up special field office adjacent to powder plant project to serve equipment needs.



TRAILER PAY WAGONS carry paymaster's clerks directly to construction areas and save time and confusion in distributing checks to workers.



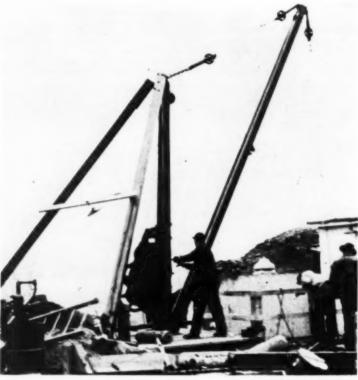




EVERY APPLICANT for employment must pass series of tests designed to eliminate all who are physically defective or of questionable background. Included in eight steps of procedure during applicant's first day at employment office are: (a) eye test (first step in thorough medical examination), taking about 3 min.; (b) X-ray, 2 min.; and (c) fingerprints, 10 min. Fingerprints go to du Pont headquarters in Wilmington, Del., and thence to F.B.I. in Washington for checking.



AT BOTTOM of concrete caisson well, hydraulic jacks force successive welded sections of screen pipe through port hole in wall into surrounding gravel stratum.



HAND-OPERATED DERRICK lowers equipment and materials into well for pipe-jacking process.



PERFORATED SCREEN
PIPE (left) is projected by
jacking through gate valve
fitted to port hole. After
collector pipe has been installed, valve is controlled
by stem rising to operating platform above water
level in well.

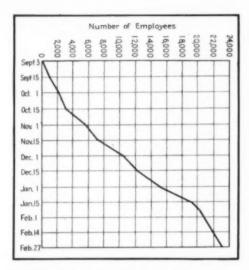


BORING HEAD (above) at forward end of perforated pipe makes possible jacking through sand-gravel material for distances up to 200 to 300 ft.



**SAND LINE** made up of sections of 2-in. pipe with threaded joints carries suspended line material from boring head back through screen pipe as jacking progresses.

Louisville, Ky., the 600 buildings required for the six powder production lines of the plant are located on fairly level terrain at an average elevation about 190 ft. above pool stage in the river. Other parts of the tract are cut by gullies and ravines which required culverts and fills of considerable size for the plant railroad. An adjacent line of the Baltimore & Ohio provides railroad connections to the site. Commuter trains charging 32c. per round trip furnish daily transportation for about 5,000



PAYROLL builds up rapidly from zero on Sept. 3 to 23,000 on Feb. 27.

workmen from Louisville and the two Indiana cities of New Albany and Jeffersonville; the trains stand on sidings at the plant station, outside the fenced area, during the day shift, waiting for the return trip.

Two powder lines were included in the original contract between the Army and du Pont, signed by the powder company, the Chief of Ordnance and the Quartermaster General on July 17, 1940. This contract proposed that the two lines be put in operation by the contractor in 10 months. Supplemental contracts later increased the size of the plant to six powder lines, but additions to the work were not permitted to impair the original plan to start production on two lines by May 17. The contractor's energies and resources have been directed to beating the deadline by as many days as possible.

#### Organization

Lt. Col. R. E. Hardy, Ordnance Department, U. S. Army, is commanding officer and constructing quartermaster in charge of the Indiana Ordnance Works for the government, which is the owner of the \$86,000,000 powder plant, designed for a working life of at least 25 years. The du Pont Company acts as the government's agent for construction and operation of the smokeless powder plant, receiving a fixed fee for its construction services.

In the contractor's organization, construction responsibility is divided as shown by the accompanying organization chart. The job is broken down into nine sections, each under the direction of a division engineer. These men report to assistant construction superintendents, of which the job has two. The senior assistant has general charge of all nine sections and is directly responsible for three. The junior assistant is in direct charge of the remaining six sections and reports through the senior assistant to the superintendent, who holds overall responsibility for the entire construction operation. M. R. Warden was superintendent from the beginning of the job until the middle of January, when he moved up to the position of regional supervisor. G. P. Church has been superintendent since that time.

#### INDIANA ORDNANCE WORKS

Smokeless Powder Plant Charlestown, Ind.

APPROXIMATE QUANTITIES to Jan. 25, 1941

Excavation:

Earth 820,000 cu. yd. Rock 35,000 cu. yd. Concrete: 58,000 cu. yd. Structural steel: 2,500 tons

Brick: 7,000,000 Fence: 10 miles

Permanent buildings: (4 Powder Lines)

450

Roads: (4 powder lines) 30 miles Railroads: (4 powder lines) 60 miles

#### Construction Equipment:

Trucks and automobiles: 500
Cranes, shovels, bulldozers, etc. 100
Miscellaneous Equipment (including pumps, air compressors, power units, etc.) 260

#### Number of Employees on Various Shifts:

1. 8:00 to 4:30 15,000 2. 4:00 to 12:00 3,500 3. 12:00 to 8:00 1,500

#### Andical

Doctors 12 Nurses 8

ESTIMATES OF QUANTITIES compiled Feb. 27 called for 94,164 cu. yd. of concrete, 4,773 tons of structural steel and 12 mi. of fence.

At that date, total employment of 23,000 was distributed among three shifts as follows: (1) 16,000, (2) 5,000, (3) 2,000.

Plans for the plant originate in the engineering design offices of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Design and construction operations of the corporation in general are under the direction of H. B. Eaton, manager; G. M. Read, special assistant; and O. R. Ames, assistant manager.

#### 2... Seven Collector Wells Assure 65 M.G.D. of Water for Powder Making

ENORMOUS WATER CONSUMPTION is characteristic of smokeless powder manufacture. To meet the needs of the \$86,-000,000 powder plant at the Indiana Ordnance Works, seven concrete caisson wells sunk alongside the Ohio River to a water-bearing gravel stratum and fitted with radiating collector pipes will supply 65 m.g.d. of water possessing two highly desirable properties: sufficient purity to be used for processing purposes without filtration or other treatment, and a practically year-round temperature of 56 deg.F., making it effective for condenser use without further cooling.

Executing its eighth contract in the United States and its fifth for duPont, the Ranney Water Collector Corp., of New York, is developing this advantageous and economical supply by its patented method of jacking slotted screen pipes horizontally into the gravel stratum from inside the concrete caisson wells, forming a continuous cavity for projection of each radial pipe by washing out the fines during the jacking process. The remaining coarse material surrounding the pipe will be protected against later occlusion by fines in two ways: Low velocity of the inflowing water drawn into the collector pipe will

produce minimum movement of fine material, and control of the horizontal collectors by individual valves will make it easy to backwash them separately whenever necessary.

#### Seven Wells

An original contract to provide a guaranteed supply of 32,000 g.p.m. (46 m.g.d.) called for five wells spaced at about 1,600-ft. intervals along the river bank. When expansion of the powder plant increased the demand to 65 m.g.d., a supplemental contract was awarded to provide two additional wells, spaced

2,000 ft. apart. Pool stage in the Ohio River is El. 420, which is the static level of the wells. Concrete caissons were sunk to depths of 48 to 63 ft. below this elevation, 93 to 108 ft. below maximum flood level, El. 465. Floor level at the top of the wells is El. 466, an average of 13 ft. above ground level. Horizontal screen pipes were jacked through port holes in the walls of the caisson wells for distances up to 200 to 300 ft. into the gravel

Primary objective and advantage of the Ranney system is the production of large volume (about 9 m.g.d. per well) with minimum velocity and drawdown. Slotted (screen) area of each 8 ft. section of radiating pipe is equal to ten times the cross-section area of the 8-in.diameter pipe. In the rare occasion when an obstruction may prevent further projection of the pipe, jacking is shifted to another screen line, and the projected length of the first pipe is utilized for water collection after the well goes into service. Additional screen lines can be projected during the later life of the well if greater capacity is desired.

Operating conditions, involving constant immersion and low velocity of inflowing water, with minimum drop in pressure through the pipe slots, are not conducive to corrosion and incrustation, in contrast to the common condition encountered in vertical wells.

#### **Construction Procedure**

In sheeted pits excavated to groundwater table the contractor sank caisson shafts of 13-ft. inner diameter and 18in. wall thickness by the conventional method of adding concrete lifts and digging inside the vertical concrete cylinders with clamshell buckets. The first concrete section, forming the bottom of the well, contained a circumferential groove for insertion of 79-lb. 12x12-in. W.F. beams to reinforce the concrete plug sealing the bottom of the well. Caissons were sunk into the gravel stratum to a level where the collector pipes could most easily be forced into the surrounding material. A diver set the W.F. beams under water and directed the placing by tremie of the concrete plug sealing the bottom. The caisson was unwatered by an American Well Works 40-hp. 600-g.p.m. well pump, originally equipped for a 65-ft. lift which had been extended by addition of two impeller stages.

Accompanying photographs illustrate features of the equipment utilized in jacking the 8-in, screen pipes after the caisson had been unwatered. Special corrosion-resistant Toncan iron pipe, made up from plates punched and longitudinally welded, came to the job in 8-ft. lengths. Preliminary tests of the material in the gravel pack surrounding projected screen pipe at this location had shown that the gravel was large enough to bridge 3/8-in. perforations, and slots of this width were punched in the steel plate at the shop. As jacking of a pipe proceeded, successive sections were joined by electric welding, the welder depositing two or three circumferential beads in a half-V butt joint.

At the forward end of each collector pipe the contractor used a perforated boring head, illustrated by a photograph, welded to the first pipe section to make it possible to jack the line into the gravel. Inside the boring head was inserted a cast-iron bushing which supported the forward end of a 2-in. sand line running back through the screen pipe to the well. This small-diameter pipe carried away water and suspended fine

material which washed into the boring head during the pipe jacking process, leaving a coarse gravel pack around the screen pipe. Water admitted to the well through the sand line was pumped out and discharged on the surface.

Each screen pipe, equipped with boring head, was forced into the gravel by two 100-ton-capacity Watson-Stillman hydraulic jacks. Normal jacking pressure did not exceed 33 tons, or 1,000 lb. per square inch of the cross-section area of the jack rams. The pipe could withstand loads up to 120 tons without fracture. Minor deflections caused by obstructions in jacking pipe presented no serious difficulty.

#### Progress

Excavation for the first of the seven wells was started by the contractor on Nov. 4, 1940, and the well was completed five months later, early in April. The last of the seven wells is expected to be ready for service before the powder plant goes into production. Construction of the wells included jacking of 70 screen pipes totalling about 9,000 ft. in length.

After the wells go into service, two 400-hp. pumps will deliver water to the powder plant (situated about 1½ mi. distant at about 190 ft. higher elevation) through two 36-in. force mains, located ½ mi. apart for greater safety.

#### Direction

Under the supervision of the War Department and of E. I. du Pont de Nemours & Co., Inc., construction of the wells was directed for the Ranney Water Collector Corp. of New York by E. W. Silitch, vice-president and chief engineer, acting as project manager on this job, and D. M. Kresin, superintendent.

#### 3... Truck Mixers Distribute 1,000 Cu. Yd. Per Day Over 2,700 Acre Site

TO SUPPLY TOTAL CONCRETE REQUIRE-MENTS estimated at 90,000 cu.yd. for 600 buildings and numerous auxiliary structures scattered over the 2,700-acre site of the \$86,000,000 smokeless powder plant at the Indiana Ordnance Works, E. I. du Pont de Nemours & Co., Inc., contractor for the War Department, entered into an agreement with the Colonial Supply Co., Louisville, Ky., under which the latter contracted to set up and operate a plant which would assure delivery to any point in the area within 10 to 15 min. after receiving an order for concrete. A central mixing plant set up on a railroad spur inside a fenced yard and equipped with a front-end-charging Smith 3-yd. tilting mixer provided the necessary production capacity (100 cu.yd. an hour

when mixing 2½-yd. batches), and a normal fleet of 18 truck mixers, expanded to 27 or more units when necessary, gave the necessary flexibility in delivering to as many as 50 or 60 locations each day. Concrete was placed during 16 hr. (two shifts) of each working day, and the average daily output was about 900 yd., although at one period production exceeded 1,000 yd. per day for five successive days.

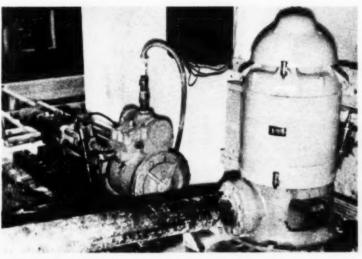
Concrete needs for the following day were reported each day by the various foremen to the division engineers in charge of the nine construction sections on the project, and the information was passed on to the general concrete foreman, who then made up the next day's working schedule for the truck mixer fleet. Short-order hauls for unscheduled concrete deliveries thus were kept to a minimum, but they received prompt service when they came into the central plant.

Bulk cement was received at the plant in special hopper-bottom railroad cars which were unloaded by an under-track screw and bucket elevator into the 300-bbl. bin of a Butler bulk cement plant. Both rail and truck deliveries were utilized to insure an adequate supply of sand and gravel. A Northwest gasoline crane handling a 1½-yd. clamshell bucket on a 60-ft. boom filled the Blaw-Knox steel bins above the batching platform. Batching equipment equipped with Fairbanks-Morse scales was designed to fit into the plant by the Colonial Supply Co.

In cold weather the concrete contrac-



PORTABLE GENERA-TOR furnishes electric current for welding successive sections of screen pipe.



**WELL PUMP** for removing water and hydraulic pump for operating jacks perform essential services in unwatering caisson and projecting horizontal collector pipes radiating from bottom of well.



\$1 A DAY is rental paid for this rolling power plant (above), one of four retired locomotives leased from Baltimore & Ohio Railroad to supply steam for concrete curing in cold weather.



**CENTRAL CONCRETE PLANT** equipped with 3-yd. mixer and served by  $1\frac{1}{2}$ -yd. clamshell crane turns out  $2\frac{1}{2}$ -yd. batches at rate of 100 cu.yd. an hour for distribution on job by truck mixers. Bulk cement received in special railroad hopper cars is delivered by bucket elevator into overhead bin.

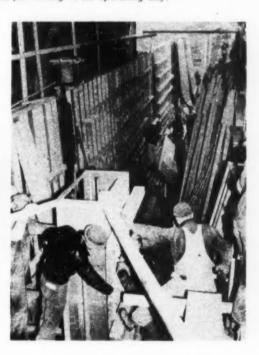


**TRUCK MIXER FLEET** normally numbering 18 units but ranging up to 27 or more units when required, distributes concrete from central plant to 50 or 60 scattered locations on job during 16-hr. operating day.

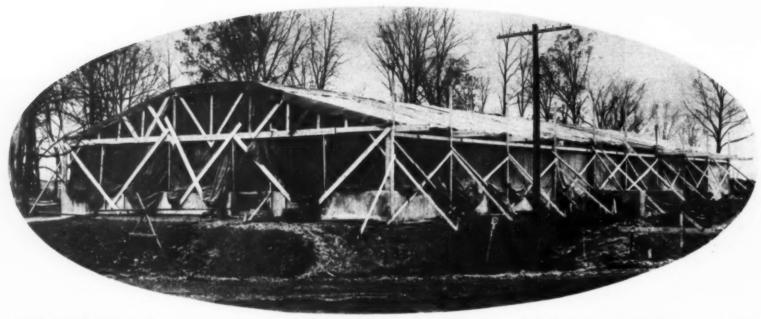


PORTABLE HOPPERS (above) quickly moved from one location to another facilitate concrete transfer from truck mixers to hand carts.





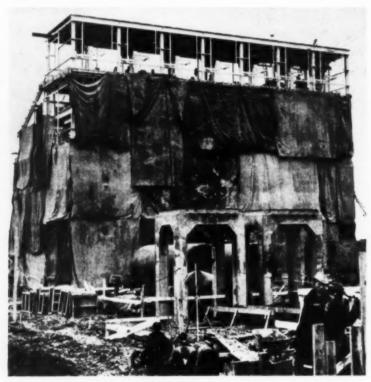
May 1941—CONSTRUCTION METHODS— Page 47



COMPLETE INCLOSURE of canvas tarpaulins secured to wood framing protects large concrete structure heated by live steam lines during curing period. Valve-controlled steam lines from locomotive are tapped into housed structure to provide heat and moisture for curing concrete.



**INSIDE CANVAS HOUSING,** concrete remains in warm, moist condition throughout curing period by virtue of released steam supplied from locomotive boiler.



**DRAPED OVERLAPPING TARPAULINS** keep winter winds from reaching concrete inside acid concentrator building.



STARTING RESERVOIR CONSTRUCTION, carpenters erect wood frames for canvas inclosures to be placed over footings.



**CEMENT MORTAR** for entire project is centrally mixed in miniature plant resembling larger concrete mixing plant and standing in same fenced inclosure with it.



FILLING STATION and repair garage service trucks and cars on project



WOOD MILL is equipped with swing and slide-arm cutoff saws for precutting dimension lumber.



**VARIABLE-ADJUSTMENT SAW** operates on all types of prefabricated lumber, including pieces requiring notches and dado. Operators wear protection goggles.

tor operated two 100-hp. boilers at the plant, one to heat mixing water and the other to supply live steam for heating aggregates in the bin. Mixing water was run backward through the tubes of one boiler to develop maximum heat. Live steam from the other boiler was admitted to the bins through 72½-in. jets, each equipped with an individual control valve. On one day, with the atmospheric temperature at 8 deg. F., the plant ran 80 yd. an hour continuously for three hours, delivering concrete into the mixers at a temperature of 80 deg.

To keep inclosed concrete warm and moist during the curing period when the weather was cold, the du Pont organization utilized a novel source of steam. Four veteran Baltimore & Ohio locomotives were rented from the railroad company at \$1 a day and were spotted on various short spurs around the job to supply steam through buried pipe lines to which the locomotive boilers were connected. Inclosures to protect concrete usually were made with tarpaulins on wood frames.

Excellent gradation of the Ohio River sand and gravel used for concrete aggregates produced high compressive strength in job-run cylinders made with either Louisville cement from Speed, Ind., or Lehigh cement from Mitchell, Ind. By far the largest single class of concrete used in the job was that designed for a compressive strength of 2,500 lb. per square inch. Originally proportioned as a 1:2.31:3.82 mix by volume, with a cement factor of five sacks per cubic yard, test cylinders made of this concrete averaged about 3,000 lb. in 7 days and about 5,300 lb. in 28 days. The cement content was reduced to 434 sacks per cubic yard to bring the concrete more in line with design requirements.

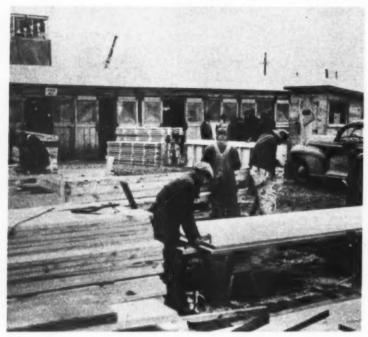
Sand-cement mortar requirements for the job likewise were furnished by the Colonial Supply Co. from a separate smaller mixing plant, also using bulk cement, set up in the same lot with the concrete plant. To facilitate truck deliveries of aggregate to this lot, a direct, fenced access road connected it with the main highway, and persons and vehicles entering or leaving the fenced central plant lot, on trips to or from the main construction area, were subjected to the same surveillance by police guards as when passing through the main gates of the plan. C. F. Colston was in charge of central plant and truck mixer fleet operations for the Colonial Supply Co. at the Indiana Ordnance Works.

## 4...Well Equipped Shops Speed Pabrication of Materials

TEMPORARY SHOPS equipped with power machinery to speed materials prefabrication at minimum cost have proved indispensable to E. I. du Pont de Nemours & Co., Inc., contractor, in maintaining fast progress required to complete in 10 months the \$86,000,000 smokeless powder plant of the Indiana Ordnance Works for the War Department. Centrally located for truck and rail delivery of supplies and for quick dispatch of fabricated materials to scattered units in the nine construction sections of the project, the group of shops provides facilities for woodworking, for cutting, welding, forging and machining metals and for cutting and threading pipe.

In the carpenter shop workmen are assisted in fast and accurate cutting and fabricating operations by universal-adjustment woodworking saws, swing and slide-arm cutoff saws and rip saws. Power hand saws are at the disposal of carpenters in the adjacent lumber fabricating yard and throughout the job to speed both precutting and trimming of erected lumber. Little cutting is done at the time of erection, all standard pieces being precut to size and shape.

Lathes and drill presses are the principal machine shop



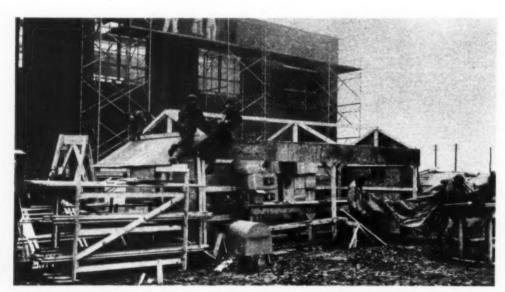
CARPENTERS assemble prefabricated lumber in yard adjacent to wood mill.



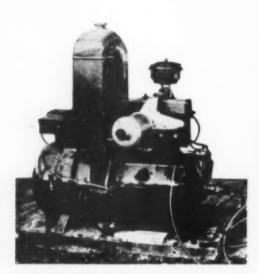
COMPLETELY EQUIPPED SHOPS for metal work possess necessary facilities for machining and welding metals and for cutting and threading pipe up to 12-in. diameter.



**TRUCK DISPATCHER** • at central garage controls movements of large fleet of construction trucks on job.



FIELD ELECTRIC SHOP is dismantled to be moved to new site. Canvas roof cover is being carried away at right.

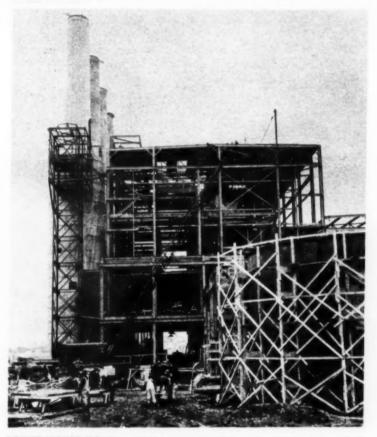




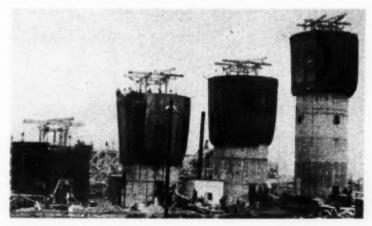
PORTABLE GENERATOR SET (left) powered by gasoline engine serves temporarily in carpenter shop to drive number of small power saws, two of which are shown (right). On basis that carpenter using small power saw can do work equivalent to six carpenters working with hand saws, portable power unit is estimated to have made possible saving of \$1,400 during two-week period. Since outside power became available in carpenter shop, portable unit has been utilized to provide power in isolated areas where it is uneconomical to extend temporary power lines.



PORTABLE ELECTRIC SAW equipped with carborundum disk cuts steel grating.



**POWER HOUSE NO. 1** is rushed to completion to serve powder lines scheduled for initial operation. As safety provision, plant is equipped with two separate powerhouses, each having capacity sufficient to supply electric energy and steam to three powder lines.



**TALL SILOS** of 22-ft. outside diameter for pulverized coal at power house No. 2 are erected to height of 88 ft. by raising 8-in. reinforced-concrete walls in successive lifts of about 10 ft. each, the concrete being placed in steel forms protected by tarpaulins during cold weather.

tools, supplemented by bench equipment and small power tools for hand use. Portable generator sets provide electric welding current, and tanks of oxygen and acetylene are mounted on small trucks to be moved easily to convenient positions for cutting operations in the shop and yard. Pipe threading and cutting machines are available to take pipe up to 12-in. O.D. The blacksmith shop has a line of five forges with electric-motor-driven draft fans. Power hand tools perform small jobs in the various shops and expedite mechanical and structural installations at all points on the job.

## 5...Two Power Stations Insure Against Stoppage of Powder Plant Production

INSURANCE AGAINST TOTAL STOPPAGE of production in the face of any disaster derives from the original plan of the Indiana Ordnance Works smokeless powder plant, which provided two power houses and interconnected power distribution systems, as well as duplicate water supply mains from the pumping stations at the wells. Each of the powerhouses in the original plan was to supply electric energy and steam to two processing lines; with the increase in size of the plant the power stations have been enlarged to take care of the additional load. Revised plans call for six power units in one station and five in the other, each unit comprising a 5,000-kw. turbo-generator and a boiler capable of producing 160,000 lb. of steam per hour at 550-lb. pressure and 725-deg. superheat.

AAA1 priority rating was given by the National Defense Advisory Commission and the Office of Production Management to powerhouse No. 1, containing five units required to start initial operation of the plant on two powder lines scheduled for earliest completion. Erection crews on this powerhouse worked three shifts a day and seven days a week, and the station is expected to go into operation on schedule despite fears of delays caused by a strike at the plant of one of the equipment producers. Accompanying photographs show powerhouse No. 1 in January, when construction already was well advanced.

Design of the two powerhouses follows recognized good practice; a power station or an emergency powder plant is not regarded as an appropriate place for innovations. Utilization of standard equipment expedites manufacture and delivery.

Outstanding among the construction features of each powerhouse are reinforced-concrete silos (for pulverized coal) surmounted by tall concrete stacks, forming continuous vertical reinforced-concrete structures which rise to a height of 150 ft. above the ground. Eleven tall silo-stack units serving the eleven boilers were built by the Alphons Custodis Chimney Construction Co., Chicago, subcontractor, using steel forms for intermittent concrete pours of about 10 ft. each.

Walls of the reinforced-concrete silos are 8 in. thick; the structures have an external diameter of 22 ft. at the base, and the silo section rises to a height of about 88 ft. Resting on each silo is a smokestack 62 ft. high with an internal diameter of about 7 ft.; the outside diameter at the top of the stack is 8 ft. 10 in. By virtue of the tall stacks, the boilers will have a strong induced draft as well as forced draft.

Foundations—Piers of powerhouse No. 1 rest on sound rock capable of supporting safely a design load of 40,000 lb. per square foot. For powerhouse No. 2, spread footings were placed on rock underlain with shale seams, making it neces-

sary to reduce the unit load to 4,000 lb. per square foot.

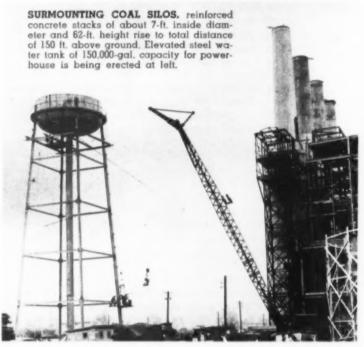
Steel and Concrete—Structural steel for the frame of powerhouse No. 1 (five boilers and turbo-generator units) exceeded 1,200 tons. The building has a Mahon steel channel roof deck covered with 1-in. cork insulation and 20-year bonded built-up roofing.

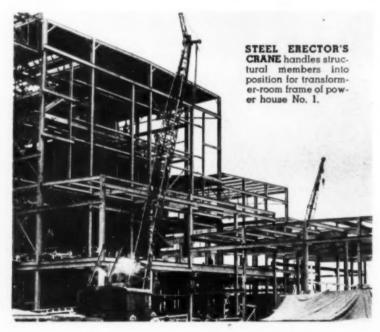
In conjunction with each power house is a 5,000,000-gal. reinforced-concrete reservoir (covered with a wood roof and 20-year bonded built-up roofing), a 150,000-gal. elevated steel water tank, and several black iron tanks at ground level for a Permutit water softening system for boiler water.

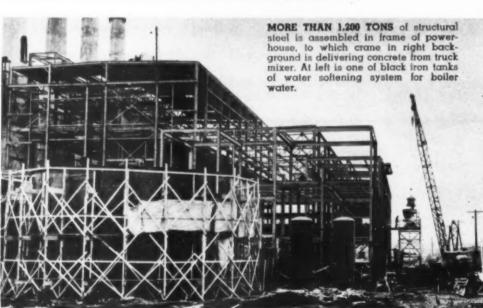
Subcontractors played important parts in equipping and erecting the two powerhouses. Among the suppliers and erectors of equipment are the Combustion Engineering Company for boilers, the Westinghouse Electric & Mfg. Co. for turbo-generators, the Allis-Chalmers Mfg. Co. for condensers, and the Link-Belt Co. for coal conveyors.

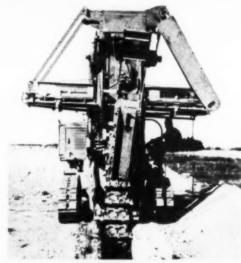


POWER-HOUSE SMOKESTACKS and water tower are pushed up to full height in advance of installation of boilers and generating equipment.





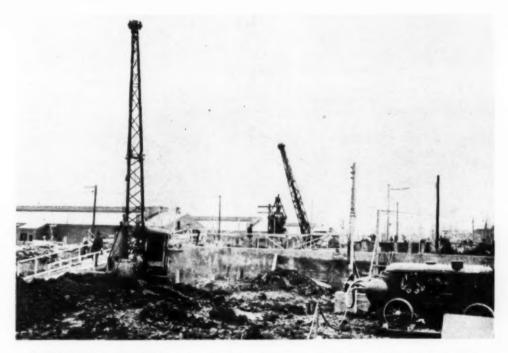




TRENCHING MACHINE with capacity of about 25 cu.yd. per hour excavates deep and narrow trenches for foundation walls. Two trenching machines, each operated by one man, were expected to provide an estimated saving of \$17,000, as compared with hand excavation costs, during course of job.



**WET WEATHER** causes no postponement of construction operations as workmen set footing forms in muddy trenches.



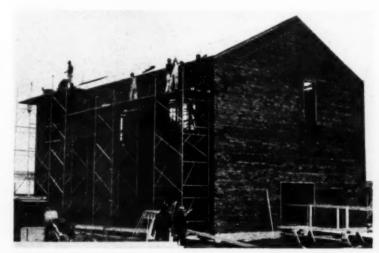
SELECTED FILL MATERIAL is placed by clamshell cranes inside concrete foundation walls.

## 6...Powder Plant Buildings Employ Wide Range of Structural Materials

POWDER MANUFACTURE requires the handling of explosive material through a series of processes which for safety's sake are dispersed through a large number of buildings designed and spaced to minimize hazards and promote efficient plant operation. At the Charlestown, Ind. smokeless powder plant being erected for the War Department by E. I. du Pont de Nemours & Co., Inc., contractor for construction and operation, the buildings range from the massive powerhouses already described to small, simple sheds consisting of nothing more than floor, walls and roof. The buildings differ not only in size and structural design; they also make use of a wide variety of building materials.

To start at the bottom, heavier structures are placed on rock, which ordinarily is uncovered 10 or 12 ft. below the surface of the ground. As indicated by conditions under the two powerhouses, the safe bearing value of the rock may range from 40,000 lb. to as little as 4,000 lb. per sq.ft., the latter figure being based on presence of weak seams under overlying sound rock strata. For the lighter structures, spread footings on earth are used for greater economy.

Brick is the favored material for exterior walls; both load-bearing and closure types, particularly in the acid and powder areas of the plant. Availability and price in the Louisville area,



**SECTIONAL STEEL SCAFFOLD** assists roofers placing corrugated asbestoscement sheets on water dry house.



CRAWLER CRANE raises roof ventilator to position on ridge.

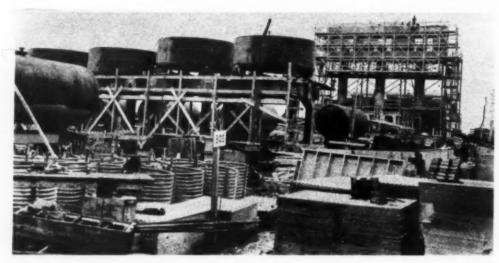
as well as the established record of brick for durability in this location, determined the choice of this material for wall construction in many of the plant buildings. Up to January 25, 7,000,000 brick had been used, estimated to be only about one-third of the number required for the entire job. Other important closure materials are corrugated sheets of asbestos cement or protected metal on wood frames.

Asbestos cement sheets also are used extensively for roofing. Bonded built-up roofing is employed on both steel insulated steel decks and wood decks of minimum pitch covering large areas. Some buildings have cement tile roofs.

Reinforced concrete and steel have been utilized in heavy structures, steel being employed notably in the powerhouses and reinforced concrete in the coal silos, smokestacks and acid concentrator buildings, illustrated by accompanying photographs.



LABORERS CLEAN UP rock excavation for concrete reservoir tank of water re-use system in acid area.



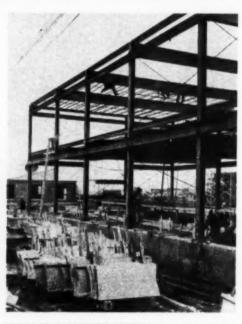
TANKS AND COILS are erected in acid area to serve processes in powder line. In background is tall frame of ammonia oxidation building.



**40-LB. RAIL** on creosoted ties is typical of light track over which industrial locomotives will haul process material in small cars.



**BRICK WALLS** are prominent feature of buildings in powder area.



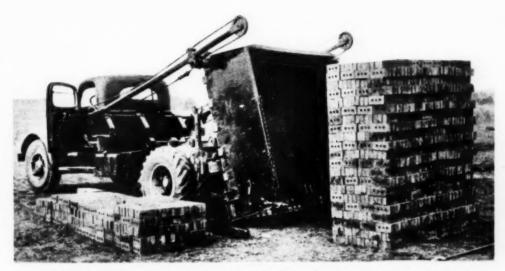
**PRECAST CONCRETE PANELS** on bar truss joists will form roof of steel frame field laboratory.



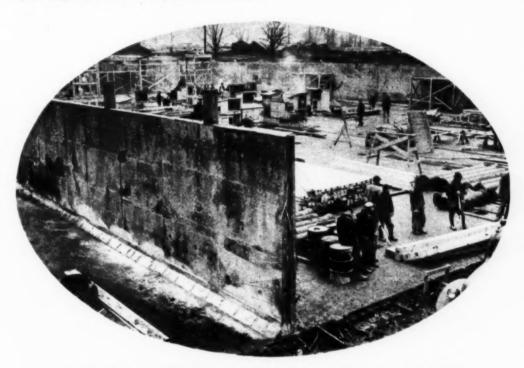
**ASBESTOS CEMENT** in corrugated sheets attached to wood frame covers walls and roof of shipping house.



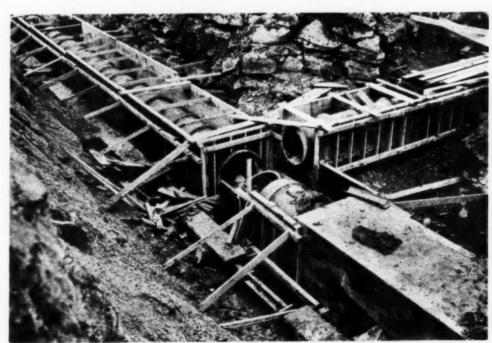
CORRUGATED PROTECTED METAL incloses side walls of building into which crane is handling steel member through wall opening.



SELF-STACKING TRUCK unloads 2,400 brick in about 2 min. Special trucks of this type haul large percentage of brick from freight cars to building sites.



5.000,000-GAL RESERVOIR for powerhouse has reinforced-concrete floor and walls.



SEWER LATERAL of heavy vitrified clay pipe connects with main interceptor at junction chamber.

## 7... Past Work on Utilities Hastens Powder Plant Completion

TABULATED DATA reproduced with Section 1 of this article indicate that utility requirements of the \$86,000,000 smokeless powder plant being completed by the du Pont organization at Charlestown, Ind., for the War Department's Indiana Ordnance Works are equivalent to those of a large city. Water required by the plant furnishes an outstanding example of the utility load; the water consumption will be three times that of nearby Louisville, Ky., serving 380,000 population. In looking at the data in Section 1, it should be remembered that the figures represent installations during the first 20 construction weeks, when underground lines probably were less than 60 per cent complete.

To start operation of the first two powder lines within the time limit, it was necessary that many of the underground and surface utilities be completed and ready for service in less than 10 months. The contractor assigned sufficient crews and equipment to the work, and expediters placed emphasis on deliveries of materials, to assure completion of water, sewer and power lines in ample time for initial plant operation.

#### Plant Railroad

Railroad and highway facilities were needed first to permit plant construction to progress. In 54 working days at the start of the job the construction force put on permanent roadbed 13 mi. of plant railroad track and completed the essential portions of a classification yard with a storage capacity of 250 freight cars. On installation of an 11-ft.diameter multiplate culvert 135 ft. in length, the crews began culvert assembly on a Sunday and had the fill ready for rail operation on the following Thursday. The table in Section 1 mentions 60 mi. of plant track; about 60 per cent of the track uses 100-lb. rail and remainder 40-lb. rail.

Crushed-Stone Roads — Road construction was pushed with equal speed to eliminate delay in handling materials in bad weather. By the fiftieth working day, 21 mi. of stone-surfaced roads had been completed and put in service.

Trenching Plow—To excavate shallow trenches for temporary lines and for drainage, the contractor gained speed



and economy by using a trenching plow hooked to a tractor. During the first weeks on the job the plow cut trenches for 2 mi. of temporary water lines alone.

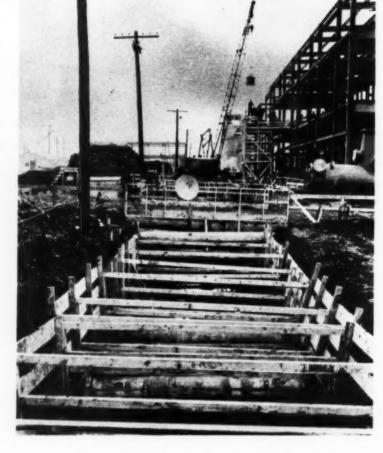
Sewers—Permanent sewer and water mains are of substantial construction warranted to give trouble-free service throughout the life of the plant. Sewer lines of vitrified clay pipe, laid in trench, are incased in 4 in. of concrete reinforced with wire mesh under roadways and at other points where surface loads might be expected during construction or later operation of the plant.

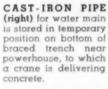
Night Lighting—Relatively little use was made of portable light plants for night work during construction of the Charlestown smokeless powder plant. Temporary pole lines were strung to all parts of the job, and these lines carried strings of electric lights. Spotlighting in certain areas was effected by means of floodlights.

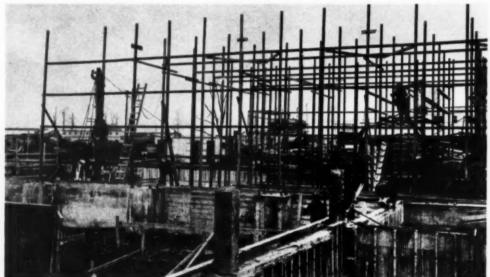
Fence—One of the first construction jobs involved complete inclosure of the plant area with 10 mi. of Cyclone non-climbable wire fence fastened to steel posts set in concrete. The fence is flood-lighted for night surveillance throughout its length.



TRENCHING PLOW digs shallow ditches quickly and economically for drainage and temporary utility lines.







REDWOOD FRAME for cooling tower is erected alongside powerhouse reservoir.



11 FT. IN DIAMETER and 135 ft. long, multiplate corrugated culvert is installed at location where foundation explorations, revealing number of small limestone caverns, caused original plan for railroad trestle to be changed in favor of earth fill, less likely to be disturbed by impact of moving locomotives. Culvert is assembled and fill completed ready for rail operation in 4 days.



PIPE OF PEACE is smoked by Frank W. Clark, director, California Department of Public Works, and Chief Tahachwee, of Kawie Indian tribe, as part of ceremony of dedicating newly constructed express highway, known as Arroyo Secco freeway, between Los Angeles and Pasadena.



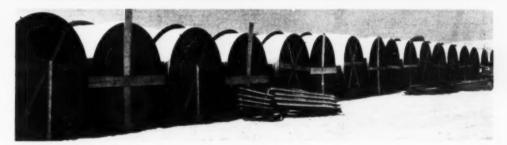
MAMMOTH BOLT, weighing 140 lb., is lifted into place for connection of rotating shaft which will link 150,000-hp. turbine with 108,000-kw, generator at Grand Coulee dam, U. S. Bureau of Reclamation project in Washington.



HUGE TEMPLATE is prepared in mill loft to aid pre-framing of tall timber trestle bents for logging railroad of Weyerhaeuser Timber Co. near Long View, Wash. Trestle is 1,130 ft. long and 235 ft. above bed of Baird Creek. Bents were pre-framed by Timber Structures, Inc., of Portland, Ore.







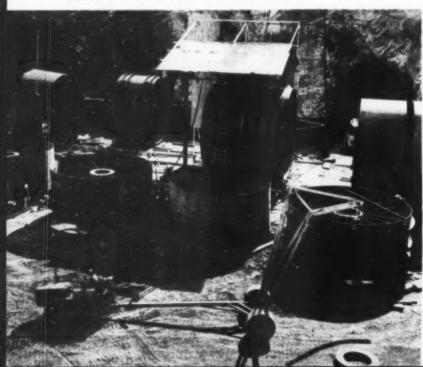
WIRE MESH SCREENS, to prevent entry of unauthorized persons, are fastened across lower halves of large steel pipe sections stored in materials yard at Friant dam. Pipe interiors are carefully coated at factory, and screening was found to be necessary to put stop to foot marks and other nuisances that occurred.

"PERMANENT" HUB (below) for transit setup presents difficult problem in location at Shasta dam, where structures and material are likely to be moved around frequently. Here Pete Anker, chief of party of U. S. Bureau of Reclamation survey crew on dam, perches on 8-in. concrete wall which separated diversion channel from main Sacramento River bed. Bad enough as it is — what will it be when he turns a right angle?



"CHERRY PICKER" for passing 5-cu.yd. muck cars on single track raises empty for placement at heading end of train operated by crew of Dravo Corp., contractor, of Pittsburgh, Pa., on driving of 13½-ft. linished diameter tunnel for New York City's Delaware River aqueduct. Procedure involves these steps: Tail car of train is spotted under lift of "cherry-picker," uncoupled and raised above track; train then moves forward toward mucking machine at heading where loaded car, waiting from last trip, is coupled to end of train and pulled back beyond cherry picker; suspended empty car then is lowered, coupled to head of train and moved up to heading for loading.

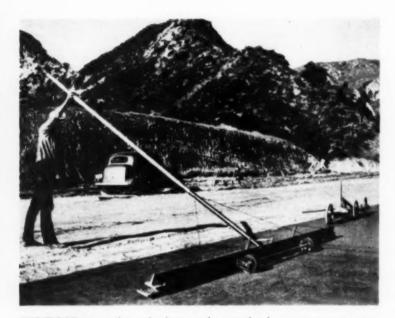
**STEEL LINING PLATES (below)** for four penstock tunnels at Parker dam on Colorado River are handled to storage or assembly by Chicago Bridge & Iron Co. with Le Tourneau 20-ft. tractor crane hooked up to Caterpillar 35-hp. diesel tractor. Sheets are lowered into 60-ft. pit by stiff-leg derrick erected in hole with aid of same tractor-crane unit.



## They Did It

CONSTRUCTION DETAILS

For
Superintendents and Foremen



**CUT FLOAT** mounted on wheels is used on portland cement concrete paving jobs of California Division of Highways to remove rare irregularities that remain after mechanical drag finisher has completed its work.

FLUSHING DEVICE (below) to control mosquito breeding by repeated automatic filling and flushing is installed by South Carolina Public Service Authority on small stream of Santee-Cooper power and navigation project, South Carolina. Developed and first used in India, device is being employed on this project for first time in U.S. Concrete flushing siphon (similar in effect to automatic flush tanks used in some sewer lines) is incorporated in timber dam.



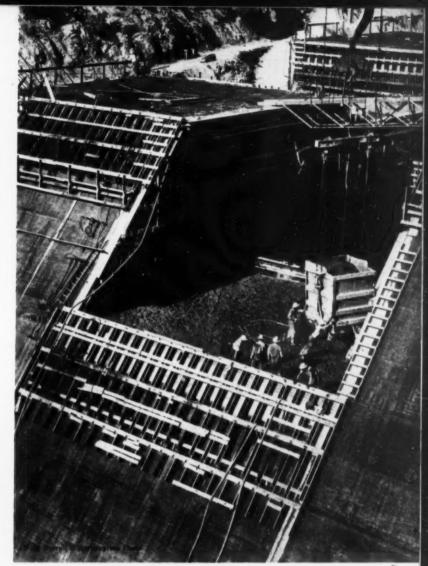


**ALL-WHEEL-DRIVE FEATURE** of Ford trucks equipped with Marmon-Herrington drives enables units mounting under-body blades or drawing pull-type maintainers to get on to gravel roads and strike off washboard ridges while roads are still soft.



MECHANICAL FINISHER (above and below) adjusted to 4-ft. widening strip rides on edge of old concrete slab and on steel side form to finish additional concrete increasing pavement width to 22 ft. on 6-mi. improvement by Missouri State Highway Department of U.S. 50 entering Kansas City from southeast. Project includes construction of second 22-ft. pavement for four-lane divided highway.





**RECTANGULAR CONCRETE BUCKET** lowered by cableway deposits 8 cu yd. inside forms for 5-ft. lift in one block of Shasta dam, being built by Pacific Constructors. Inc. for U.S. Bureau of Reclamation on Sacramento River, Calif. Adjacent blocks previously had been raised five lifts, 25 ft., above this block. Dam will take 6,000,000 cu.yd. of concrete.

STREET DECKING (below) and underpinning of elevated railway piers keep traffic moving on all levels at La Salle-Clark-Lake station of Dearborn St. subway in downtown Chicago during construction by John C. Tully Co., contractor for Chicago Department of Subways and Superhighways.



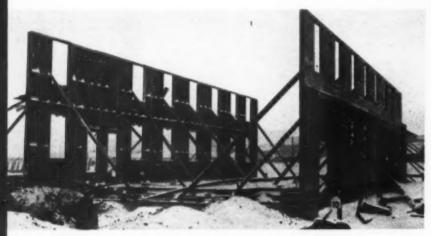


\*TRU-TRACTION IS
POWER ON BOTH
TRACKS AT ALL TIMES

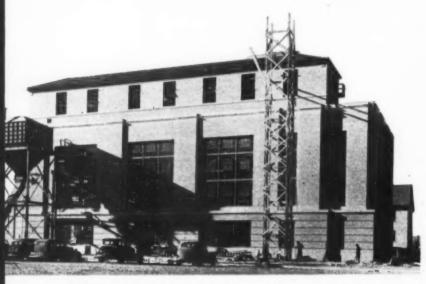




**WALLS OF WOOD BARRACKS** are fabricated flat on ground and then upended with aid of crane. Note projecting wood members to support eaves over first and second-story windows.

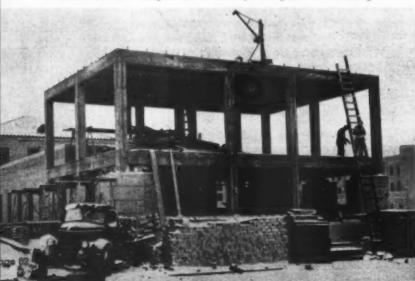


SIDE WALLS UP-ENDED from horizontal position on ground are held in vertical position by temporary bracing until end walls are placed.



**HEATING PLANT** is imposing building with large areas of glass windows in brick walls,







ENGINEERING-CONSTRUCTION PERSONNEL at Lowry Field includes PAUL E. STROUSE (left) engineer on staff of Lieut.-Col. C. H. Jabelonsky, Constructing Quartermaster, and ROBERT L. CARLISLE, chief engineer inspector for Army.



**PLANS OF STRUCTURES** at Lowry Field are reviewed by ARTHUR A. MATTHEWS (left) office engineer, and G. W. SHERIDAN, mechanical inspector.



TIE PLATE is placed under rails of 14-mi. line by JAMES GUNSON, in charge of construction; as R. N. JOBE, WPA district engineer, and CHARLES R. OTTO, field engineer for Army, look on.

## Lowry Field Air School REQUIRES WIDE RANGE OF



**TEMPORARY BARRACKS** are two-story wood frame structures 80x30 ft. in plan, with projecting eaves over first and second-story windows.

NATIONAL DEFENSE BUILDING ACTIVI-TIES at Lowry Field, U.S. Army Air Corps Technical School, Denver, Colo. have been going full tilt, with most of the 109 buildings involved in the project either under construction or completed. Lieut.-Col. C. H. Jabelonsky, Constructing Quartermaster, is in charge of the project. Construction has been handled both by contract and by WPA forces, the latter covering grading, sewers, warehouses, bomb magazines and railroad construction.

Forty 2-story barracks of the temporary wood type were erected last winter to house 2,500 officers and men pending completion of the permanent barracks building program. The temporary barracks are of frame construc-

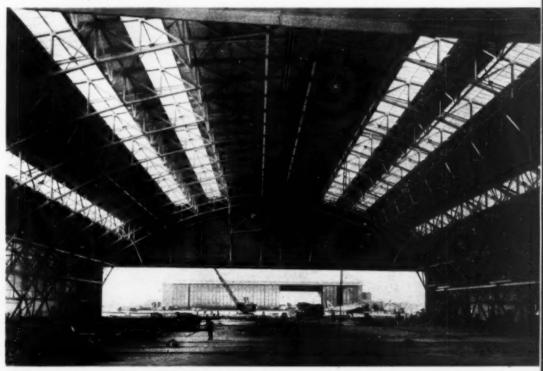
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STANDARD-GAGE RAILROAD 14 mi. long is



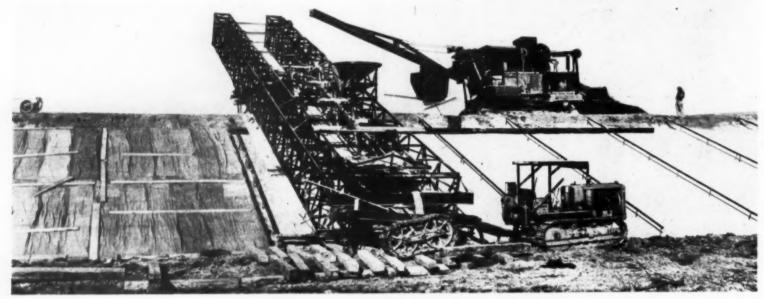
TYPICAL HANGAR is steel frame structure 300 ft. long, 285 ft. wide and 93 ft. high. Walls and roof are of asbestos-protected metal.



CLEAR FLOOR SPACE within hangar is provided by trusses spanning 285-ft. width of building.

PERMANENT BARRACKS (below) of reinforced concrete frame design with brick facing will house 2,000 enlisted men. Fourth floor is used for class rooms.





## Traveling Plant PLACES CONCRETE SLOPE PROTECTION



CANTILEVERED CHANNEL RAILS, with 6-ft. clearance between them, carry wheels of skip car on which operator rides to control car braking and spreading of concrete. Note how lower chords of bridge trusses clear grade rails set on steel pins above gravel blanket.

TRAVELING CONCRETE PLANT makes use of mobile bridge carrying 2-yd skip car which rides up and down slope between two trussed girders. Mounted at toe and crest of embankment on crawler tracks, bridge is moved ahead by tractor and by 34E dual-drum paver which leeds concrete to skip car through hopper carried on one girder.

TO PLACE 92,000 CU.YD. OF CONCRETE PAVEMENT on the upstream face of earth embankments in the Santee Dam of the Santee-Cooper project, South Carolina, the Cornell-Young Co., Macon, Ga., holder of a \$1,440,000 contract for the slope protection and attendant concrete work, operates a traveling bridge carrying a movable skip car which distributes concrete on the slope. Designed in cooperation with the contractor by the Insley Mfg. Co., the bridge comprises two trussed girders supporting cantilevered inner rails on which the wheels of the skip car ride. For mobility, the bridge is mounted at the toe and crest of the embankment on crawler tracks; at the upper support, the girders rest on rollers which enable the bridge to adjust itself to variations in height of the dike.

Maximum vertical height of the slope protection is 33 ft., and the greatest width of pavement placed by the traveling plant is about 94 ft., measured on the slope. Each of the trussed girders, 110 ft. long by 6 ft. deep and 3 ft. wide, is made up of bolted sections connected to one another with wedge joints as required to produce a longitudinal profile which conforms roughly to varied grades of the bank slope and maintains the lower chord a distance of 8 in. above the concrete.

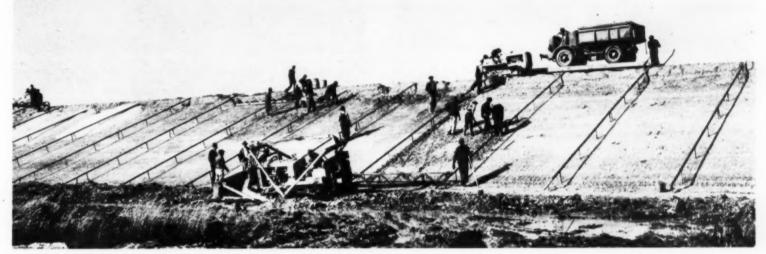
At the top of the bank pavement is a wave-deflecting cap wall, about 2 ft. high, which is placed as a later operation to complete the full height of the slope protection and carry it up to the level of the dam crest. Down the embankment face from the line of this cap wall, for a vertical distance of 8 ft. below crest elevation, the bank pavement is on 2.5:1 slope; for the next 10 ft. of vertical distance, on a 2.8:1 slope; and for the final distance, up to a maximum of 15 ft., on a 3.1:1 slope.

#### Concreting Procedure

Concrete specially designed with a minimum of fines to produce a porous slab is mixed by a Ransome 34E dual-drum paver traveling on the 10-ft. roadway on top of the dike and is delivered to the skip car through a hopper mounted on one of the bridge girders. To fit varying heights of embankment, the hopper can be moved up and down the girder by a cable from a hand winch. An operator rides on the skip car, of 2-yd. capacity, and controls the gate which discharges the concrete on the slope. The car is moved up and down the slope by a cable leading to a Mead-Morrison single-drum gasoline hoist mounted in the bridge above the upper crawler tracks.



THREE STAGES of slope paving are served by grade rails set on steel pins driven into embankment. In foreground, screed riding on these rails is operated by two tractor-powered winches to strike off earth subgrade. Beyond this outfit, second similar screed is striking off 4-in. gravel layer. In distance, traveling concrete plant is in position to place concrete which will be screeded by equipment operating on same rails.



AFTER PREPARING SUBGRADE in alley between two rails, screed and two tractors move ahead to perform similar function in next alley.

Concrete slab, of uniform 10-in. thickness, is placed on a 4-in. gravel layer which will serve as a drainage channel for trapped water. Grade rails set on steel pins in the embankment serve a triple purpose during the construction of the slope protection, as indicated by accompanying photographs. In the preparation of the earth subgrade and the placing of the gravel base, the rails provide tracks for steel screeds operated by power winches on tractors. The traveling concrete bridge is designed with sufficient clearance (8 in. above the concrete) to pass over these rails. After the traveling plant has spread the concrete on the slope and has moved ahead, a third set of screeds is operated on the rails to strike off the surface of the slab.

#### **Progress**

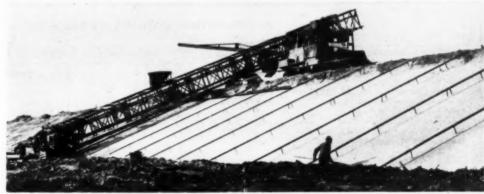
During its first weeks on the job, the traveling concrete plant averaged 300 cu.yd., or more than 1,000 sq.yd., per 8-hr. day. Maximum production by the plant up to March 25 was 60 cu.yd. per hour.

A contract calling for 92,000 cu.yd. of porous concrete slope protection and almost 70,000 cu.yd. of other classes of concrete was signed by the Cornell-Young Co., Macon, Ga., and the South Carolina Public Service Authority, legally constituted agent of the govern-

(Continued on page 109)



TWO-LINE CONTROL, with uphaul rope reeved through idler sheave attached to weighted cart on crest, enables single tractor-winch outfit to operate screed spreading 4-in. gravel blanket,



GRADE RAILS are left in place above gravel blanket to carry screed used in striking off 10-in. porous concrete slab placed by traveling plant.



TUNNELING AND EXECUTIVE PERSONNEL on Carlton drainage bore. Back row (left to right): JOHN R. AUSTIN, superintendent; O. P. TANNER; MERRILL SHOUP, president; A. H. BEBEE, manager of mining. Pront row (left to right): BOB WELCH, master mechanic; J. G. FARMER, engineer; MAX BOWEN, manager of milling; DAVID P. STRICKLER, counsel.



MINE DRAINAGE BEGINS as Carlton bore, driven 28,970 ft. from portal on Feb. 20, taps flow of 20,000 g.p.m. Picture taken at point 1,000 ft. from portal, after 19 months of tunneling, shows (left to right): JACK G. FARMER, tunnel engineer; one of shifters; ROBERT P. WELCH, master mechanic; and JOHN R. AUSTIN, superintendent.

Photos Thos I Rasho

#### Carlton Tunnel STARTS GOLD MINE DRAINAGE

DRIVEN FOR THE EXPRESS PURPOSE of draining water from the lower levels of seven existing gold mines and reviving production in the Cripple Creek district of Colorado, the Carlton Tunnel of the Golden Cycle Corp., (described in Construction Methods for September, 1940, p. 64) attained its initial objective Feb. 20, after 19 months of effort, when an underground flow of about 20,000 g.p.m. was tapped after the bore had penetrated a distance of 28,970 ft. from its single portal. Planned for a total length of 32,000 ft. through hard rock, the tunnel has a cross-section 10 ft. wide and 11 ft. high. Work has proceeded at a rapid pace under the direction of 6-ft. 8-in. tall John R. Austin, superintendent for the Golden Cycle Corp., who has supplied the accompanying mile-by-mile statistics for the first 5 mi. of the bore. Summarized, the fig-

#### SUMMARY OF TUNNELING Statistics to Feb. 20, 1941 When Drainage Began

Distance driven, ft28,970
Time timbering, hr
Time drilling, hr
Time mucking, hr6,2063/4
Cu.yd. excavated (solid) 109,792
No. 3-cu.yd. cars mucked53,219
Powder used, lb951,280
Powder per ft., lb
No. of caps used145,431
No. of caps per foot
Total rounds
Footage per round
Total working days567
Average daily footage51.09

ures show that 26,400 ft. of tunnel was driven through granite from one portal only in 513 working days, for a daily average advance of 51.46 ft. From Sept. 6, 1939, to Dec. 23, 1940, or 465 working days, a total of 24,747 ft. of tunnel was driven for an average of 53.22 ft. per day, with no day's advance less than 40 ft. Drilling was done with Ingersoll-Rand power-feed drifters and (except during the early stages of the work) detachable Jackbits.

Work on the Carlton Tunnel was started July 13, 1939. The bore has been driven in a straight line at a grade of 0.003. When a small stream of water spurted under pressure Feb. 20, Superintendent Austin ordered rock drills dismounted and placed on top of the drill carriage, muck cars run out and all miscellaneous equipment removed before the big inflow began at about 5 P.M.

#### TUNNEL-DRIVING STATISTICS, BY MILES, FOR FIRST 5 MILES

OPERATION	FIRST MILE	SECOND MILE	THIRD MILE	FOURTH MILE	FIFTH MILE
Total time timbering	160 hr. 30 min.	NONE	NONE	NONE	NONE
Total time drilling	1,463 hr. 15 min.	1,488 hr. 45 min.	1,236 hr. 35 min.	1,113 hr. 15 min.	1,232 hr. 15 mir
Total time mucking	1,280 hr. 15 min.	1,103 hr. 15 min.	1,067 hr. 25 min.	1,142 hr. 35 min.	1,023 hr. 35 mir
Total cu.yd. excavated (solid)	20,437	19,661	20,069	20,290	19,569
Total 3-cu.yd. cars mucked	11,165	9,341	9,397	9,594	9,091
Total pounds of powder used	128,667	189,079	183,189	171,695	181,104
Pounds per ft	24.4	35.8	34.7	32.5	34.3
Total number of caps used	26,395	26,356	25,243	26,248	26,030
Capa per ft	4.98	4.99	4.78	4.97	4.93
Total number of rounds	889.71	823.35	659.71	642.21	624.68
Feet per round	5.93	6.33	8.00	8.22	8.45
Total number of working days	121	108	96	94	94

#### **HOW ARMY IS DIRECTING**

### Billion Dollar Construction Program

By BRIG. GENERAL BREHON SOMERVELL Chief, Construction Division, Office of Quartermaster General, Washington, D.C.

THE STORY of the temporary emergency construction program being carried out by the Construction Division, Office of the Quartermaster General, is the story of the man with the contract. All over the nation, members of the A. G. C. and non-members, are at work as agents of the United States Government, building camps, cantonments, arsenals, munitions plants and powder factories, in the program for national defense. In July 1940 the nation was suddenly plunged into a preparedness campaign that taxed all the resources of industrial brains, management and organization, as well as the skill and craftsmanship of labor and the patriotism of both. The challenge, I am happy to say, has been met.

It has been a gigantic task. Hammers did not begin to ring until well into October. Spades were not wielded, in many locations, until heavy frosts had penetrated the ground. The wonder is that so much has been accomplished in so short a time. The man with the contract, in my opinion, has more than made good.

Maybe there is an ideal spot somewhere for building, overnight, trooptowns of from 25,000 to 60,000 population each, but as yet we haven't found it. When we do, we probably won't

need the skill, integrity and responsibility upon which the A. G. C. prides itself. Not all the mud through which we all have been wallowing, of course, has come off the lot. Much of it has been synthetic, thrown at us by hostile critics. If any of it sticks, it is our own fault. For those shortcomings that can be explained, but not excused, some of it may be deserved. The law of averages, however, is bound to prevail in a program involving a billion dollars, 200 projects, large and small, and half a million employees.

Since early last fall, a fund of approximately \$1,100,000,000 has been made available for the temporary emergency construction program by the Congress. About three-fourths of this amount is going into troop-housing and the rest into the con-

Reproduced, in part, below is the text of an address by Brig. General Brehon Somervell, U. S. Army, newly appointed Chief, Construction Division, Office of the Quartermaster General, delivered Feb. 20 before the annual convention at Houston, Tex., of the Associated General Contractors of America.



BRIG. GENERAL BREHON SOMERVELL

struction of storage and production plants. Compared with the construction program of World War days, it is in many ways more varied and extensive. Planning is better, construction is better, equipment is better, design is better. Increased attention is being given to the elements of comfort and safety in the erection of troop shelter and accommodations. Water and sewage utilities worthy of prosperous small towns are being installed. Theatres, recreation buildings and guest houses are being provided. Adequate, livable and sanitary quarters for Uncle Sam's citizen army are the objectives of the program. It is the intention of the Construction Division to see that they have been attained in each instance when the troops move in.

Little need be said regarding the magnitude of the task when dirt began to fly. We had a combined total of Regular Army and National Guard strength of but 475,000 troops, yet even then, we had accommodations for but 300,000. That meant that for an army of 1,400,000 men, the Construction Division had to build shelter for more than 1,000,000 and build it in a hurry. Funds for the program became available on Sept. 9, 1940, and work began immediately. On the building schedule were 10 large Reg-

ular Army cantonments, 6 for the National Guard, 2 small ones for Anti-aircraft Training Centers, 21 cantonments of various sizes for Replacement Centers and 12 large tent camps for the National Guard. And some of these projects, it must be borne in mind, were for camps to house from 40,000 to 60,000 men each.

Most of the construction had been started and portions of it were well on the way to completion before I became identified with the program. Certain changes in organization, in the Washington office and in the field, have since been inaugurated for the purpose of decentralization and increased efficiency. The 11 branches into which the Washington office was formerly divided have been reduced to 5. These are: Operations, Engineering, Ad-

### Features of Army's Emergency Construction Program

\*

\$1,100,000,000 fund available for temporary emergency construction program.

200 projects, large and small.

500,000 employees on construction work.

1,400,000 troops to be provided with shelter.

10 large Regular Army cantonments.

6 National Guard cantonments.

2 anti-aircraft training centers.

21 cantonments for replacement centers.

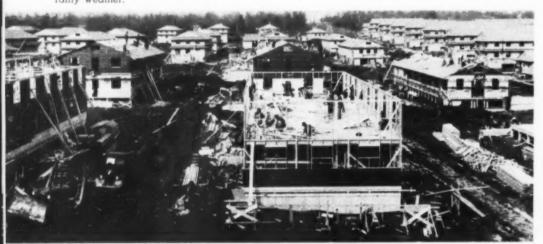
12 large tent camps for National Guard.



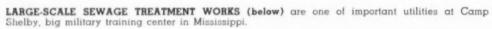
TYPICAL 63-MAN BARRACKS has double eaves for ventilation of first and second stories during sainty weather.



TROOP HOUSING AREA is studded with tents on wood platforms at Camp Barkeley, Abilene, Texas.



CANTONMENT CONSTRUCTION is here shown in full swing at Seventh Corps Area Training Center, Newburg, Mo.

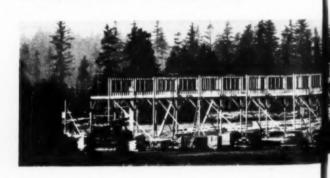




ministrative, Accounts and Real Estate. Their functions are indicated by their titles. The head of each reports directly to the Chief of Construction.

Two new sections have been created, a Control Section and a Public Relations Section. The Control Section is the statistical and reports unit of the Division, through which the Chief of Construction may learn at any time the status of a project or of the program as a whole. Both the Control Section and the Public Relations Section also report directly to the Chief of Construction.

In addition, a Labor Relations Section and a Safety Section have been set up in the Administrative Branch. Both act in an advisory capacity to the Chief of Construction. Labor relations and safe-





**BOILER HOUSE,** with corrugated sheathing, for hospital heating plant at Camp Barkeley, Abilene, Texas.

STORY BARRACES. ard plans, at Fort George G. Meade, in Maryland, accommodates 63 men



TRENCHING FOR WATER MAIN is one of many construction activities at Seventh Corps Area Training Center at Newburg, Mo.

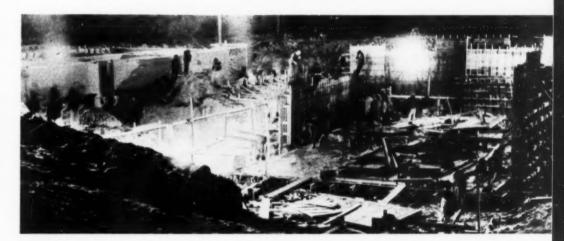


ty conditions on the job, are matters within the jurisdiction and under the responsibility of the individual contractor, but anything that the Washington office can do to assist along these lines seems to us a service that is desirable.

All contractors are aware by now that the field operations have been divided into 9 zones, corresponding in geographical limits to the 9 Corps Areas of the Army. A Zone Constructing Quartermaster has been appointed to each zone and is now functioning. In all matters pertaining to construction, he is under the sole jurisdiction of the Quartermaster General; in others, to the Corps Area Commander.

The Zone Constructing Quartermaster

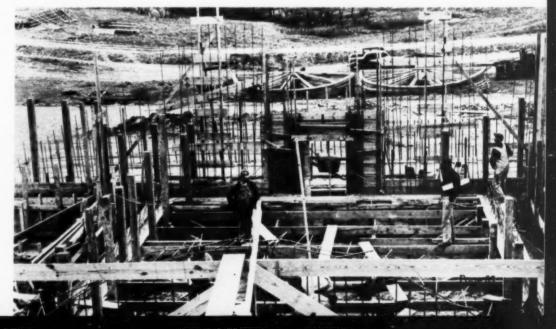
(Continued on page 113)



NIGHT SHIFTS push construction work on sewage treatment plant at Camp Claiborne, in Louisiana. on eve of arrival of troops.

TWO-UNIT LAUNDRY BUILDING PROJECT of

wood frame design is under way at Fort Lewis, Wash. Each unit is 270x178 ft. in plan. Two will have capacity of handling laundering of clothing of 80,000 men. STORAGE FOR MUNITIONS (below) is provided by eight magazines being built by Long-Manhattan-Watson Co., general contractors, at Fort Riley, Kansas. Structures will be of special reinforced concrete design, including igloo-shaped dome, to insure protection against extreme vibrations, lightning, extreme temperatures and rain. Hills separate individual magazines to minimize damage in case of accident.



AT DETROIT ORDNANCE PLANT (below) in Michigan structural steel frame for assembly building is completed, as work proceeds on roofing, brick work, stone sills, sash and glass.

### Shop-Built Sections

### Of TVA Houses Are Trucked to Site and Bolted Into Units

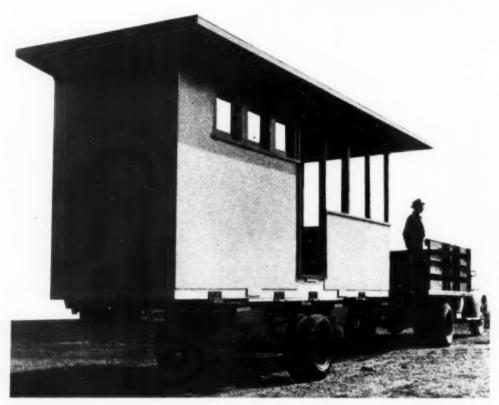
AS AN ECONOMICAL MEANS of housing workers temporarily employed at its construction camps, the Tennessee Valley Authority has developed a factorybuilt, portable cottage, six of which have been produced for use at Pickwick dam, in Southwestern Tennessee. The new cottages are built in sections, each of which contains one complete portion of the building-floor, walls, ceilings, and roof, with electric wiring, light bulbs, plumbing, with bathroom and kitchen fixtures in place, windows, screens, doors, kitchen cabinets, electric cooking plate, and refrigerator already installed and painted, ready for immediate use.

The smaller cottages are in three sections, the larger cottages in four. Each section is 71/2 ft. wide, 22 ft. long, and 91/2 ft. high, and weighs about 3 tons. The sections are fitted together with bolts. The construction is wood frame with exterior of weather-proof insulating fiberboard. Four workmen can assemble the sections into a completed cottage within 4 hr. The only parts of the cottages constructed on the ground are the supporting cinder-block piers. Dismantling can be carried out in as short a time as the assembling, and a cottage can be transported to another site with no loss except the cost of the piers.

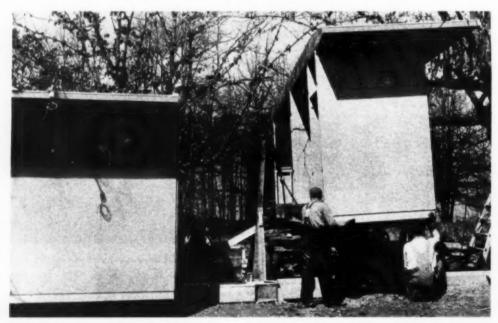
The single-cottage model consists of a combination living and bedroom, a kitchen, bath, a small bunk room, and a screened porch. For vacation use it will accommodate four to five persons. The larger cottage is a duplex, and on each side of the central partition is one large room, a kitchen, and a bath. The cottages are styled in the modern manner, with flat, wide, overhanging roofs, and either of two exterior color combinations are used, buff with tan or gray with green.

#### **Shop Production**

The six portable cottages produced by TVA—four of which are duplex were turned out in the Authority's machine shop at Muscle Shoals, Ala., by production-line methods common to industrial mass production. All equipment used is standard to the average wood-(Continued on page 112)



**PORTABILITY** is feature of sectional cottage which consists of units  $7\frac{1}{2}$  ft. wide, 22 ft. long and  $9\frac{1}{2}$  ft. high, each weighing about 3 tons.



**DELIVERED BY MOTOR TRUCK TRAILER,** section is unloaded with aid of chain-hoist and bolted to portion of cottage already in place.



COMPLETED COTTAGE consists of prefabricated sections bolted together at site. Construction is wood frame with exterior of weatherproof insulating fiberboard.

#### Present and Accounted For

#### A PAGE OF PERSONALITIES



PLANS OF CHRYSLER CORP. TANK PLANT at Detroit, Mich., involving main building 500x1,380 ft. and other structures costing \$5,000,000, are examined by group consisting of (left to right) MAJOR H. R. KADLEC, Constructing Quartermaster supervising work for War Department, E. J. HUNT, operating manager of plant, and H. L. WECKLER, vice-president and general manager of Chrysler Corp. Tank arsenal was designed by Albert Kahn Associated Architects & Engineers. General contract was awarded to O. W. Burke Co., of Detroit, and steel erection to Bethlehem Steel Co.



COUNTY ENGINEERS confer at recent Michigan Highway Conference. (Left to right) OTTO S. HESS, engineer-manager, Kent County Road Commission; LEON V. BELKNAP, engineer-manager, Oakland County Road Commission; JOHN A. LONG, engineer-manager A.R.B.A. County Highway Officials Division; and LEE O. BROOKS, president, Michigan Association of County Highway Commissioners and Engineers.



ON HUGE DRYDOCK PROJECT and supply terminal for Navy Department at Bayonne, N. J., GEORGE B. MITCHELL (left) general superintendent for George H. Flinn Corp. and Great Lakes Dredge & Dock Co., congratulates CHARLES PADPETT, shovel operator, on removal of first dipperful of earth under contracts of \$10,000,000 and \$5,000,000 respectively.



JOHN W. BERETTA, president of J. W. Beretta Engineers, Inc., San Antonio, Tex., is newly elected president of National Society of Professional Engineers.



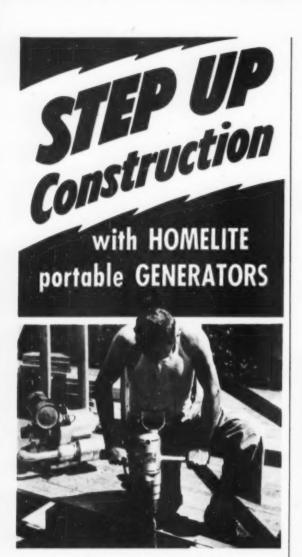
DANIEL J. RYAN, contractor, of Providence, R. I., and head of New England Concrete Co., has been appointed by Governor McGrath to serve as director of Rhode Island Department of Public Works.



ARGENTINA NATIONAL ROAD COMMISSION reaches New York City on S.S. Brazil to make inspection tour of highways in United States and visit plants where road-building equipment is manufactured. Group includes (left to right): D. A. LODEIRO BLANCO; C. R. ZARAZAGA; H. FERNANDEZ GARCIA; A. J. L. BOLOGNES; and H. O. E. ALBANO.



NEW GENERAL MANAGER and chief engineer of Metropolitan Water District of Southern California, in charge of nearly completed Colorado River aqueduct, is JULIAN HINDS, former assistant chief engineer, who succeeds Frank E. Weymouth, retired at his own request to act as consulting engineer.



#### SPEED UP YOUR DAY WORK

Faster work with fewer delays — that's exactly what you get when you run your electric tools with a Homelite Portable Generator. You own your own power. You don't have to depend on local power installations. No waiting. No costs. You simply set up your easily portable 83 pound Homelite right where your workers want it — start the built-in gasoline engine — and instantly you have 1800 watts, 110 volts, — enough power to drive several electric tools right up to peak capacity.



#### SPEED UP YOUR NIGHT WORK

Use a Homelite Portable Generator to operate floodlights as well as electric tools. Makes night work more efficient and safer — speeds operations. A Homelite supplies enough power to operate several brilliant floodlamps. And the light is steady — for a Homelite has an automatic control that keeps the voltage constant, regardless of load.

Write now for our complete bulletin, showing Homelites at work on jobs like yours. No obligation.

### HOMELITE

CORPORATION

200 Riverdale Avenue, Port Chester, N. Y.

## CONSTRUCTION EQUIPMENT NEWS

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Review of Construction Machinery and Materials for MAY, 1941

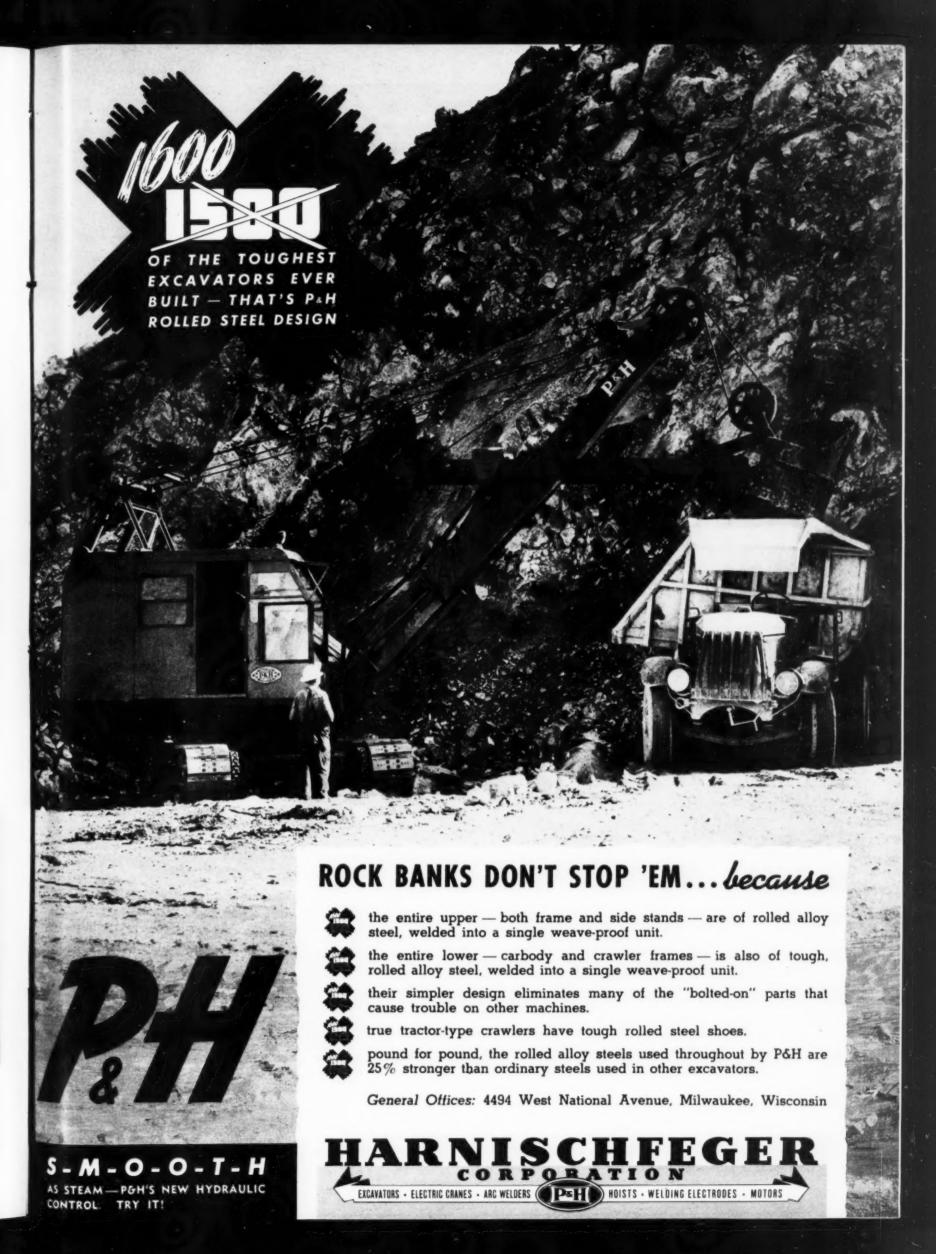
DIESEL MOTOR GRADER designed for heavy grading, bank cutting, ditching (both forward and reverse) oil mixing and snow removal, weighs 21,500 lb., and has 75 hp. Greater earth-moving capacity is attained through 22 in. of clearance under "Hi-arch" front axle and 6¾ in. between "Roll-a-way" blade and circle permitting full volume of earth to roll off blade. Power is supplied by General Motors 2-cycle, diesel engine developing 75 hp. and offering advantages of unit injection, four-way cooling, faster acceleration, smoother power, easier starting and full protection of air, oil and fuel filters. Transmission features short,

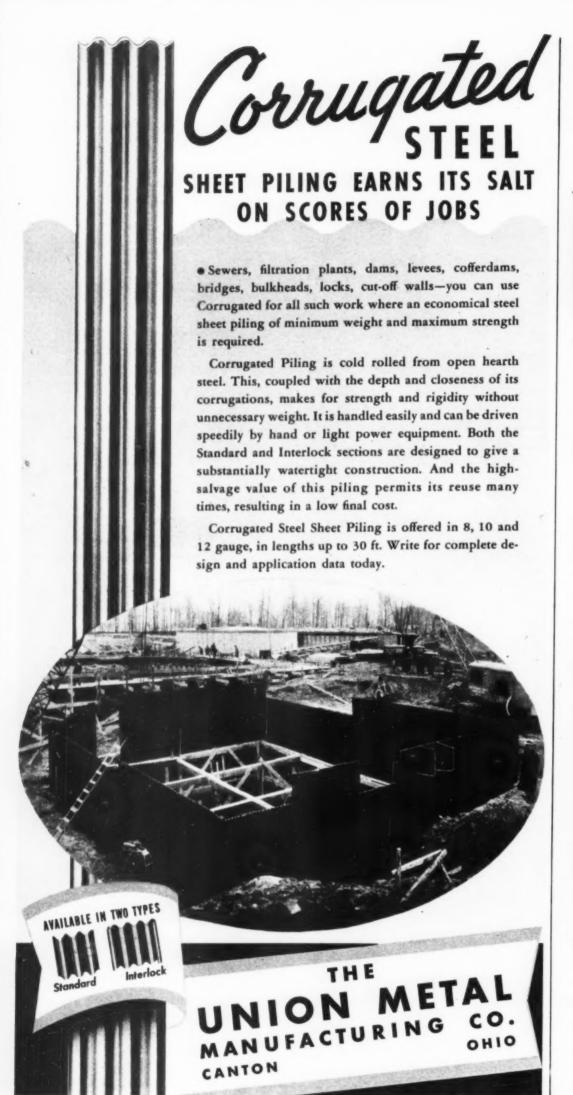


heavy shafts and carburized and hardened gears. Unit has six forward and three reverse speeds, and with throttle' control, forward speeds from 1.48 to 16.6 m.p.h. and reverse speeds from 1.75 to 6.15 m.p.h. Grader frame consists of 10-in. tubular frame, heavy box-section girders and vertical section modulus at lift cases of 86.0. Lift cases mounted directly over circle for rigid blade control. Full revolving blade has bank cutting angle of 90 deg. and blade reach outside front wheels of 5 ft. 71/2 in. Tandem drive assembly supported on 41/2-in. main drive shaft and is chain driven. Standard equipment includes electric starting and lighting, leaning wheel for front axle, adjustable radiator shutters, muffler, 12-ft. mold-board, two 7.50-24 (10 ply) front tires and four 12.75-24 (8 ply) rear tires. For special conditions, 10- and 14-ft. moldboards, 2-ft. extensions, 11-tooth scarifiers, all steel canopy top or all steel cab and V-type snow plow are available.—Allis-Chalmers Co., Milwaukee, Wis.



TAPERED SCREED WINGS are one of features of improved 1941 Flex-Plane finishing machine for concrete paving operations. With their use, pile of concrete along forms, it is claimed, is always tapered in cross-section, instead of forming vertical pile which often falls over forms, resulting in loss of concrete. Two-unit 20-in.-wide sectional screed has front section that can be set from 0 to ½ in. higher than rear section, so that in case of dry material exact amount of concrete required is cut off with first section and reduced and finished by second section, without over-run. Another screed improvement covers crown adjustment near ends; no shims are required as this operation is now done with additional adjusting bolts.—Flexible Road Joint Machine Co., Warren, Ohio,



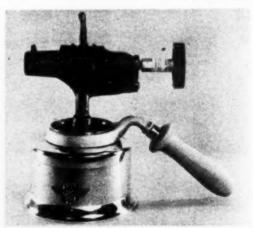


TRACTOR SHOVEL. mounted on Caterpillar D7 tractor and called Traxcavator, is available with 2- or 2½-yd. bucket and has been built in response to demand for larger machine of this type capable of handling all kinds of digging, earth moving and construction materials with ease, speed and at low cost. Full 23,000-lb. push of tractor is applied to bucket to penetrate and dig in tough soils and in clay, caliche, shale and frost. Travels at speeds up



to 6 m.p.h., turns in its own tracks and is said to have unusually fast loading cycle. Tractor equipped with extended track frame provides proper stability and traction to handle  $2l_2$ -yd. bucket. V-belts transmit power from tractor power takeoff to bucket hoist. Heavy perforated steel guards protect V-belts and driving mechanism. Hoisting clutch disengages when bucket reaches maximum height. Bucket tilts back 30 deg. during first 5 ft. of lift to prevent spillage of material. Hinged top sheave brackets permit reduction of overall height when necessary for transporting. Lifting height, 10 ft. from ground to bottom of bucket. Bulldozer blade and other attachments available.—Trackson Co., Milwaukee, Wis.

GASOLINE PUMPLESS SAFETY BLOW TORCH, with fuel capacity of 1 pint, eliminates pumping, is said to be easier to handle and to produce heat up to 2,000 deg. F. Will turn down to pilot light and stay lit for hours enabling operator to have torch ready for instant use. Delivers from 7-in. to small pointed 1-in. flames. Bottom and top of heavy, drawn brass tank are welded to stay bolt for extra strength. Said



to burn in any position and not to be affected by wind. Tested for 1,000-lb. pressure; maximum pressure developed 35 lb. Equipped with adjustable handle. Nozzle made to take flame spreader, heating pan and extra large soldering copper. Besides elimination of pump, makers claim following safety advantages: (1) Cannot explode or leak; (2) gets hot quickly and stays hot; (3) may be used in any position; (4) fuel line does not clog; (5) natural grip. comfortable handle adjustable to any position—Davis & Murphy, 500-10 N. Dearborn St., Chicago, Ill.

PREFABRICATED STEEL RETAINING WALL continuous bin type, for use on highways, railroads and flood control projects, has frame bents that can be furnished either in knocked-down form for bolt assembly in field or shop-welded and shipped to job as completed unit. By adopting latter method one-third of wall erection is completed when units arrive on job. Welded frame bents are raised into place and front and rear stretchers are connected to flanged columns of frame, bent, said to result in

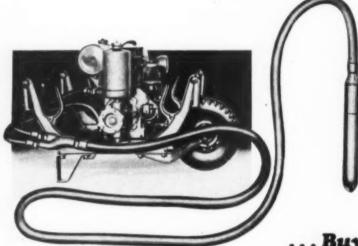
## WORLD FAMOUS! SMITH MIXERS are Achieving an Enviable Record of Performance on the World's Greatest Concrete Projects In South Africa - Argentine - India - New Zealand - Russia - Mexico - Japan - Hawaii - in fact, in practically every section of the Globe - Smith Tilters are setting the pace for concrete mixers, producing millions of yards of uniform concrete on a fast, production basis. And, Smith-Mobile Truck Mixers and Agitators are earning big profits for ready-mixed concrete plants. Designed and fully guaranteed by SMITH - Mixer Manufacturers for more than 40 years. All standard sizes of concrete mixers, truck mixers, and agitators available. Write for literature. The T. L. SMITH CO., 2851 N. 32nd ST., MILWAUKEE, WIS. 56-S Tilters installed Agitators used by a large New Zealand pre-mix plant. vo Smith 28-S Tilters on Vina Dam job, Argentine. Fleet of 10 Smith-Mobile No. 4 Truck Mixers owned by Ready-Mix Concrete Co., Ltd. Hawaii WORLD'S GREATEST CONCRETE



Why fool around with "second-best"?

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GET DEPENDABLE EQUIPMENT



Automatic pressure lubrication —requires no attention.

34-ft. hose—2%"
vibrator head.

Adjustable frequency to 6800 R.P.M. — sub-merged in concrete.

Powerful gas engine-4.7 H.P.

Long-lived, ballbearing, rotary, hydraulic pump.

... Buy the Fast

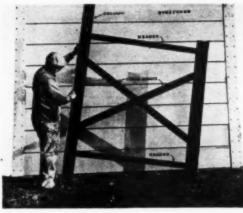
JACKSON Hydraulic Concrete Vibrator

Designed to "take it" for 3 shifts a day — every day. Used exclusively by many large defense contractors.

ELECTRIC TAMPER & EQUIPMENT CO.

DEPARTMENT E

LUDINGTON, MICHIGAN



greater speed of erection at reduced labor cost. Suitable bearing plates proportioned to height of wall and superimposed loads are provided at base of each column. Frame bents are strong, sturdy columns joined together by tie bars or headers, adequately cross-braced. Stretchers are heavy steel fabricated channel-shaped sections. Designed to fit curves of any radius by controlling length of stretchers. To insure long life, each integral part receives coating of bituminous material.—Steel Retaining Walls, Inc., Cleveland, Ohio.

HYDRAULICALLY CONTROLLED MOTOR GRADER, single member frame, engine-over-transmission type, is available either with hydraulic or manual steering mechanism. Offered with gasoline power units



ranging from 31.5 to 65 hp., and with diesel power units from 39 to 66.5 hp. Modern features of reversible blade, high lift bank sloping position and power-controlled leaning front wheels incorporated in design. De luxe all-steel, fully inclosed truck-type cab fitted with safety glass and 11- and 13-tooth scarifiers.—W. A. Riddell Corp., Bucyrus. Ohio.

FIVE NEW WHEEL TRACTORS, for use in construction, maintenance, materials-handling and transportation, include three models with carburetor-type engines and two with full-diesel units. Features: Tocco-hardened crankshafts, pressure lubrication, five forward speeds up to 15 m.p.h., gear drive, countershaft brakes that may be individually



controlled or interlocked, and provision for mounting allied equipment. Gasoline engines are 4-cylinder, valve-in-head type, developing in three models 29.5, 40.5 and 54 hp. Diesel engines develop 38.5 and 51.5 hp. Recommended for operating maintainers and graders; front-end shovels and loaders, cross-walk sidewalk and other types of snow plows; road rollers; cranes and hoists; winches; brushes and sweepers; disk harrows and mixers for mixed-in-place roads; scrapers, dump wagons; trailers; tampers and mowers.—International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.

## "For Maximum Protection

# in Mud and Dust, Heat and Cold, we use GULF QUALITY LUBRICANTS"



"WE find it pays to use only the highest quality lubricants to keep our equipment on the job day in and day out regardless of the operating conditions," says this contractor. "That is why we have standardized on the lubricants recommended by the Gulf engineer."

Call in a Gulf engineer before you start your next job
—he can help you complete it sooner due to extra hours

of trouble-free service from your equipment, at no additional cost. Gulf quality lubricants are quickly available, no matter where your job is located, from more than 1200



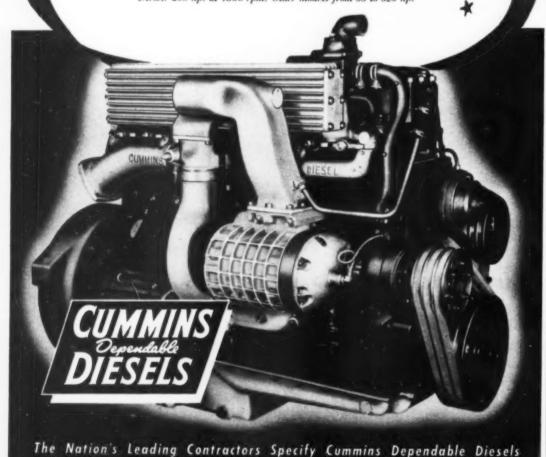
warehouses in 30 states from Maine to New Mexico. Phone or write your nearest Gulf office today.

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# 

Every phase of National Defense puts a premium on the veteran . . . the man of proved ability . . . the machine of demonstrated efficiency. In the training camps, the veteran drills the nation's manpower. In the factories, the veteran turns industry's raw recruits into master craftsmen. And on scores of construction jobs, another veteran—the Cummins Dependable Diesel—powers the trucks, shovels, compressors . . . the many other types of material handling equipment which are speeding progress on dams, roads, ordnance plants and countless other projects vital to defense. Seasoned and hardened by millions of hours of operation on all types of public works, this veteran diesel is backing up America's manpower with proved . . . dependable . . . economical horsepower. Cummins Engine Company, 1716 Wilson Street, Columbus, Indiana.

Below: Model HBS-600 (supercharged) Cummins Dependable Diesel. 200 hp. at 1800 rpm. Other models from 33 to 325 hp.



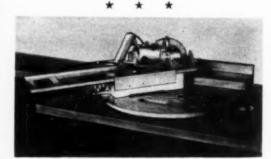


SEMI-TRAILER COMBINATION, consisting of Mack tractor and Easton semi-trailer, is offered for use in quarry operations where stiffest grades must be negotiated. Tractor has 140-in. wheelbase, 6-cylinder engine of 41/4x53/6-in. bore and stroke. Trailer has side dump body of 13-cu.yd. capacity. Unit pictured has recently been purchased to serve Missouri Portland Cement Co. at Fort Bellefontaine, Mo.—Mack Trucks, Inc., 34th St. 6 48th Ave., Long Island City, N. Y.

CABLE-CONTROLLED BULLDOZERS AND TRAIL-BUILDERS named Unitilt because of tilting device and universality of frame which permits use of both moldboards on same frame saving cost of one frame and simplifying change over from one unit to other. One man can change moldboards which can be dismounted from tractor by pulling two kingpins. Sidearms and other parts stay in place. Tilting

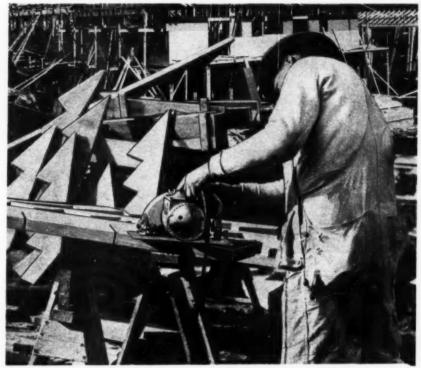


device located on one sidearm and permits, by turning of one bolt, raising or lowering of bulldozer or trailbuilder blade at either end, a distance of 12 in. Other features include: Construction of front cross-beam so that blades hug radiator, thus reducing heavy overhanging load on front of tractor and minimizing wear on front idlers and track rolls; blade curvature which rolls earth ahead, reducing dead weight and allowing larger loads in front of blade; 60-in. lift of blade and unlimited depth of cut below ground level; natural digging action of blade said to cut deep as desired without mechanical creation of down pressure; balanced design claimed to prevent tipping and to keep crawlers on ground; sidearms mounted at drive axle of tractor; rigid, fully braced members to withstand all types of bulldozing jobs.—Buckeye Traction Ditcher Co., Findlay, Ohio.

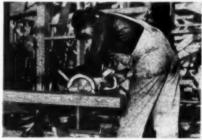


AUTOMATIC ROOF FRAMER and mitre box made for use either with Model 77 or Model 87 Skilsaw is said to enable workmen, without using steel square, to make all rafter cuts in 2x4 or 2x6-in lumber for roofs up to full pitch. Made of pressed cold-rolled steel mounted on waterproofed, laminated plywood base. Etched steel protractor scale mounted on base determines position of saw for making cuts. Another scale contains all information needed to determine length of each rafter. Weight, 23 lb.—Skilsaw, Inc., 3310 Ellston Ave., Chicago, Ill.

## Get the ELECTRIC SAWS



BLACK & DECKER ELECTRIC SAWS help beat schedules on National Defense construction projects all over the country. Shown here is a Black & Decker No. 85 Quick Saw, cutting stair stringers in a fraction of usual time at one of our huge Army camps.



B & D SAWS ARE POWERED to cut through toughest structural lumber. The husky No. 95 Black & Decker Saw, pictured above, displays its extra deep cutting ability on a heavy construction job.



PRECUTTING LUMBER puts more profit in building jobs. Photo above illustrates how contractors can cut costs and make more money by "ganging" rafter notching operations, for example, with fast No. 85 B & D Saw.



CONCRETE FORM PANELS are cut in short order with Black & Decker Saws. This shows how easily the famous B & D No. 85 Quick Saw saws. This shows how easily the famous B & D No. 85 Quick Saw cuts form lumber for concrete foundations.



B&D SAWS GO RIGHT THROUGH TOUGH MATERIAL such as corrugated asbestos-cement compositions—shown being cut with a B & D Electric Saw. Fitted with abrasive discs, these Saws cut hardest material, quickly and accurately.



ELECTRIC HAMMERS



BENCH GRINDERS

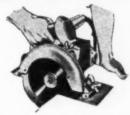


SCREW DRIVERS and



"ELECTRIC TOOL HEADQUARTERS"

## built by Black & Decker



— The Greatest Name in Portable Electric Tools

BUY YOUR ELECTRIC SAWS the same way you select other equipment - on the basis of Quality and Longer Service. BLACK & DECKER ELECTRIC SAWS are built by the world's largest maker of portable electric tools, whose dependability and superior performance are famous with tool users all over the globe. Because its engineering facilities are unequalled in the industry, Black & Decker is able to build Electric Saws with superior structural features, greater reliability and longer life. Cutting through heaviest timber ten times faster than by ordinary methods, they enable contractors and builders to slash costs and beat schedules. B & D Saws can be adjusted for angle and depth of cut in a jiffy. Safe, instant acting, telescoping blade guards. Plug in any light socket or portable generator. Phone your jobber to demonstrate the Four powerful Black & Decker Saw models on your jobs - or wire the Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson, Md.

#### Write for NEW "SAW HANDBOOK"

Just off press. Revised "Handbook" contains 28 pages crammed full of facts and pictures showing use of B & D Electric Saws and Accessories in saving time on dozens of jobs.

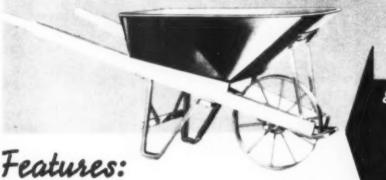


#### LEADING DISTRIBUTORS EVERYWHERE SELL



PORTABLE ELECTRIC TOOLS

# BALANCED



HARD MAPLE HANDLES
INTER CHANGEABLE PARTS
WELDED TRAYS — NO RIVETS
LARGER TRAY ROD — BUTT WELDED
V-FRONT BRACES — CROSS SUPPORT
CHANNEL STEEL LEGS WITH SHOES

Equipped with Solid Rubber or Pneumatic Tire Wheels

Where tray sheets lap, both sheets are folded around the butt-welded rod in top edge, forming double reinforcements, as shown by the cross-section at the left. This is an extra Sterling value.

STERLING WHEELBARROW CO. MILWAUKEE, WIS.



it"... and to keep on taking it 24 hours at a stretch, day after day . . . if that's what the job calls for.

If this is the kind of power you

If this is the kind of power you need for your kind of equipment, specify "Wisconsin". For detailed data, write: Dept. E-5.

WISCONSIN MOTOR CORPORATION

MEN-get complete all weather protection with TOWER'S

RUBBERIZED

SUITS, COATS and HATS



Tower's waterproof, rubberized work clothing gives dependable, durable performance. Medium weight and designed to give the utmost in freedom of movement and comfort. No cemented seams to pull apart. A choice of styles and full line of sizes to fit every requirement. Unaffected by high or low temperatures.

Also available in oiled type garments if desired. Sold by all good Dealers or

A. J. TOWER CO.
BOSTON, MASS.

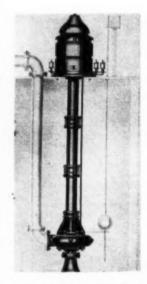
Makers of Waterproof Clothing Since 1836

MOTORIZED PORTABLE PATCH ROLLER called "Trail-O-Roller" is designed for use in rolling patches, shoulder widening, clay sub-bases, parking areas, airport runways and alley paving. Permits operator to be seated while roller is in action with all controls at his finger tips. Features: (1) Ease of



converting from trailing to rolling position — hydraulic arrangement easily raises and lowers roller; (2) heavy-duty clutch designed to stand hard usage; (3) automobile type steering control for front roller; (4) split 18-in-diameter front roller for easier steering; (5) removable wheels and stub axles for rolling up to poles, walls and curbs. Said to trail behind any truck.—Littleford Bros., 465 E. Pearl St., Cincinnati, Ohio.

HIGH VISCOSITY LUBRICANT, new heavy-duty oil known as Valvoline HPO, is said to lubricate perfectly at extreme heat, to eliminate costly repairs due to oxidation "varnish" and to clean motor of sludge as it lubricates. "HPO" is claimed to operate as lubricant in engine same as soap and water operates on grimy hands. "Detergent" acts like soap that causes oil to carry oxidation particles in suspension until they can be drained off, thereby solving oxidation problems before they had chance to attack engine. Numerous tests of this lubricant showed that while oxidation particles were circulating through motor, oil lost none of its lubricating qualities. New oil also claimed not to show corrosive tendency toward any type of metal.—Valvoline Oil Co., 5th and Butler Sts., Cincinnati, Ohio.

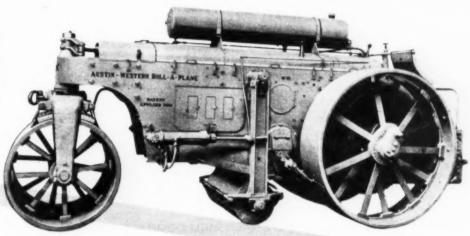


SUBMERGED SUS-PENDED SUMP AND BILGE PUMPS are "non-clogging" centrifugal units designed for intermittent-duty sump or bilge pumping, wet pit or submerged service. For disposal of surface or storm water or drainage of deep basements or underpasses, pumps are available in 2-, 3-, 4- and 5-in. sizes, for capacities up to 1,400 g.p.m., for heads up to 120 ft. and settings up to 25 ft. Pumps in larger discharge sizes handle solids up to 3 in. in diameter. Installation of pumps said to be simple operation, no dry, watertight pump pit being necessary, as

dry, waterlight pump pit being necessary, as pump is designed for suspension from floor level into sump or bilge. Construction features: Inclosed impeller with two well-rounded veins; vertical, hollow-shaft motor, with copperspun rotor; high torsional strength steel shaft; cast-iron volute said to be free from all wearing rings; discharge openings that may be placed in eight positions; corrosion-resisting closure cover and closure seal which replace stuffing box and adequately protect cast-bronze pump bearings—Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

## always OUT IN FRONT In Roller Development

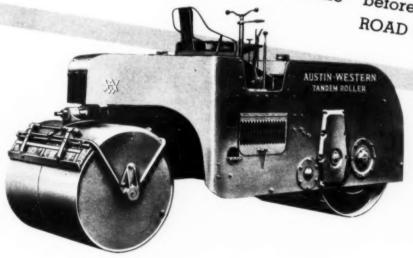
ROLL-A-PLANE: Levels and compacts with straight-edge accuracy. Center roll concentrates pressure on the high spots...forces excess material into low areas... Available in 6, 7, 8, 10, and 12-ton sizes.



Road builders with years of roller experience have learned to look to Austin-Western for leadership... for engineering and construction that assures the utmost available in smoothness and compaction, speed and economy. The first horse-drawn reversible roller, had anothe first gasoline roller were developed in the A-W plant. Outstanding open among more recent roller improvements pioneered and perfected by Austin-per Roll-A-Plane.

er Today the A-W Roller Line includes
Rollers, Roll-A-Planes and VariableWeight Tandem Units for every modern
need. Regardless of type or size, A-W
Rollers are economical with fuel and
oil . . . provide abundant power for the
hardest work . . . plus hydraulic power
steer for maximum ease and speed of
operation.

Get all the facts about A-W Roller performance and economy advantages before you buy. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.



A-W VARIABLE-WEIGHT TANDEM: It rolls and reverses with pendulum smoothness. Sets new standard for stability, visibility, ease of handling and maneuverability. Sizes: 5 to 8-ton and 8 to 10½-ton.

MOTOR GRADERS
LOADERS
BLADE GRADERS
ELEVATING GRADERS
HYDRAULIC SCRAPERS
CRUSHING AND
SCREENING PLANTS

CABLE SCRAPERS
ROLLERS
ROLL-A-PLANES
MOTOR SWEEPERS
BITUMINOUS
DISTRIBUTORS
SHOVELS AND CRANES





Iservation!

Tis said there is a sign like this along the countryside near Edinburgh, Scotland. The landowner has observed that a horse with a short tail is forced to stop eating at frequent intervals in order to "nose" off pesky flies; while a long-tailed horse goes right on grazing, switching the flies away with his tail.

You may not follow logic as closely as this canny Scot, but it is just such close observation by Goodall men over the years that can save you many dollars in mechanical rubber appli-

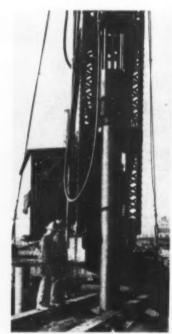
cations. Economy with Goodall products comes from Design in the Field rather than from manufacturing shortcuts. It would be difficult to name better brands than these products bearing

## GOODALL "Standard of Quality" LABEL

Look them over, then ask yourself, "HAVE WE TRIED GOODALL FOR THIS...OR THIS?"

Isn't it reasonable to assume that during these hectic times the most Dependable Line...the most Understanding Service...will come from the company that has grown, sweat, suffered and thrived with Heavy Construction men for the past 36 years... The Goodall Rubber Co.

## A Grand Pair on Any Pile Driver



#### "INFERNO" STEAM HOSE

The finest rubber steam hose you can buy.

Special Mandrel Cured, Asbestos Cord, Burstproof structure. Protected by a fine Weather Resisting Cover. For working pressures up to 200 lbs. and temperatures to 400°F. Sizes ½" to 2", maximum lengths of 50'.

#### "ALLGOOD CORD" JET HOSE

Exclusively developed by Goodall for highest pressure machine jetting. Various constructions for pressure to 600 lbs. per square inch. Genuine "ALLGOOD CORD"is distinguished by a white rubber cover.

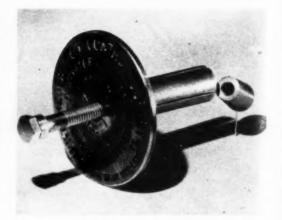


We furnish proper fittings for both installations. Send the coupon today.

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BENCH MARK placed in drilled hole in rock or masonry, on wall, floor or ceiling, eliminates pour-ing of lead and calking ordinarily required in set-ting permanent markers. Tapered nut inserted in split shaft causes shaft to expand as nut is tightened until it reaches proper resistance point, at which hexagonal head of screw snaps off, leaving exposed top surface of marker perfectly smooth—Hull Engineering Company, White Plains, N. Y.

PAINTS WHICH WILL STAND UP ON CONCRETE masonry, stucco and plaster can be prepared from parlon, new paint base now available to all paint partion, new paint base now available to all paint manufacturers for their own formulations. Protective coating of chemical composition different from ordinary paint is produced from new base, consisting of chlorinated rubber and resins dissolved in solvent with plasticizer. Applied to cement, concrete, ing of chlorinated rubber and resins dissolved in solvent with plasticizer. Applied to cement, concrete, brick, stucco and plaster on outside or inside walls, ceilings, and other surfaces, the paints have held up even under severe service conditions. Parlon is produced by chlorination of rubber. Chlorine reacts directly with the rubber to form compounds whose properties are intermediate between those of rubber and natural resins. Parlon finishes can be applied by spraying or brushing. Surface must be prepared by cleaning, derusting, removal of grease and drying. Smooth concrete surfaces must be etched with 10% hydrochloric acid to provide sufficient bond. Paint should not be applied over an old paint which will flake off carrying new surface with it, but may be applied over previous application of chlorinated rubber paint. Since these finishes dry by evaporation of solvents and do not become insoluble in these solvents, painter when applying by brush must flow finish on from a full brush, and avoid going over painted area any more than necessary. New finishes dry rapidly like lacquer. In spray finishes only 2 to 4 hr. drying time at room temperatures is necessary between coats, while 6 to 8 hr. are needed between brush coats.—Hercules Powder Co., Wilmington, Del.



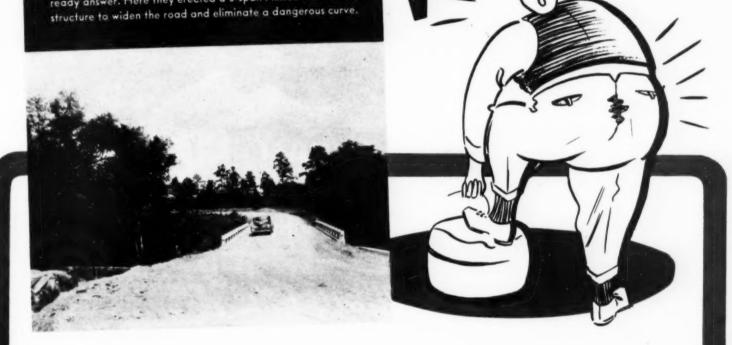
CONTAINED MECHANICAL JOINT, for use with cast-iron pipe and said to be strong flexible and corrosion-proof consists of inner ring, ar-mored gasket, outer ring mored gasket, outer ring and set of capscrews, fac and set of capscrews, inc-tory assembled into single unit. To install, Bellmaster is inserted in bell end of pipe, locked in place by twisting slightly clockwise, spigot end is "stabbed in" spigot end is "stabbed in" and capscrews tightened drawing inner ring closer to locked outer ring, thus expanding gasket against outside of spigot inside of bell, making tight seal. May be installed in from 2 to 5 min, with small ratchet wrench. Joint with resilient gasket allows deflection in any direction as well as longitudinal movement and contraction. Deflective

SINGLE-GASKETED. SELF-

caused by expansion and contraction. Deflective properties said to permit connecting pipe over ditch and "snaking" when rounding curve. Completely inclosed by bell of pipe in which it is inserted—no exposed parts or outside lugs. Shipped ready for use in wooden boxes in following sizes: 4, 6, 8, 10, 12 and 16 in.—Dresser Mig. Co., Bradford. Pa. ford, Pa.



The Road That Grew TOO BIG For Its Bridges!



• When roads must expand, an obsolete bridge is like a tight pair of pants. Yet you can "let out the seams"—eliminate these horse-and-buggy bottlenecks by extending or replacing them with Armco Multi Plate structures.

• Many roadbuilders have found Armco Multi Plate an especially wise choice when they were faced with the problem of modernizing old bridges at reasonable cost. The sturdy plate sections come to the job ready for quick, easy assembly. No special equipment or skilled labor is needed. An average arch or pipe is erected at low cost in a few days—often without interrupting traffic. Then backfilling, and you have a sturdy, maintenance-free bridge that will last as long as the road. And since the metal carries the load you can make the headwalls as simple or elaborate as you desire.

• Building strong, low-cost bridges is only one job that Multi Plate does exceedingly well. Write us or ask the local Armco man to explain its many advantages for stream enclosures, large sewers or special drainage openings. Armco Drainage Products Assn., 5044 Curtis St., Middletown, O.

ARMCO

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MULTI PLATE

A TYPE OF PRODUCT ORIGINATED AND DEVELOPED BY ARMCO ENGINEERS

## **SCHRAMM**

the perfect combination for

FAST ROAD BUILDING



#### SCHRAMM COMPRESSORS are the CHOICE of CONTRACTORS

- \* START EASILY AND QUICKLY. Built-in Electric Starting on all models from 20 to 420 cu. ft. sizes, both Gasoline and Diesel Engine driven.
- ★ EASY TO MOVE. Light weight and compact design using modern engines and compressors make moving easy and inexpensive.
- \* EASY TO SERVICE. All adjustments are accessible
- \* MANY YEARS SERVICE. Pressure lubrication to all bearings reduces wear and tear.
- \* COST NO MORE TO BUY.

SCHRAMM, INC. WEST CHESTER, PA. DEALERS IN PRINCIPAL CITIES

## hit PAY



An Owen Type S Material Handling Bucket grabs mouthful

Profitable bucket operation is dependent in a great measure on the ability of the bucket to penetrate deeply into material being excavated or rehandled; to exert a powerful closing force and to lift "A Mouthful at Every Bite." Resultant performance with "More Bites per Day" and long bucket life substantiate the claim that OWENS hit "Pay Dirt" every time.

### The OWEN BUCKET Co.

6020 BREAKWATER AVENUE . CLEVELAND, OHIO

Branches: New York, Chicago, Philadelphia, Berkeley, Cal.



DROP-FORGED C CLAMP, cadmium plat-ed, has "spatter-resist-ing" finish which pre-vents adherence of welding spatter to body, swivel and screw. Avail-able in seven sizes, with capacity opening range from 2 to 12 in.—J. H. Williams & Co., 225 Lafayette St., New York

FLAME-PROOF COTTON BUILDING INSULATION. said to provide speed of installation, savings in price and increased efficiency, and marketed under name of "Reyn-O-Cell," is made of water-repellant cotton treated to be flame-proof and fire-resistant. Said to withstand temperature of 1,500 deg. F. without flaming. Besides being fire-proof Reyn-O-Cell is said to be free from attack by rodents, vermin



and destructive fungi. Makers claim that it is not and destructive lung. Makers claim that it is not subject to decay; that it is odorless, clean, free from dust and sanitary. Supplied in blankets 16 to 24 in wide and 1 to 3\% in. thick which may be cut to suit building requirements. May be obtained with asphalt-impregnated paper backing or in combination with reflective metal insulation (aluminum foil) from with reflective metal insulation (aluminum foil). Five of six types offered to building trade are produced in mounted form with flanges for fastening to rafters, joists or studs of buildings. Flanges on insulation hold cotton blankets in center of wall construction, providing space for air circulation.—Reynolds Metals Co., Richmond, Va.

HEAVY-DUTY DUMP BODY mounted on diesel truck has capacity of 5 cu.yd. is 11 ft. long and 7 ft wide. Made of No. 8 gage high carbon steel, unit has all-steel subframe made of heavy-duty cross members and long members properly spaced to provide uniform support and to distribute lifting



## AIRPORTS







One of two Bucyrus-Erie 8-yard scrapers on the Sarasota-Manatee, Florida air field, each producing 80 yards per hour on average 600 foot hauls.

On airport construction all over the country, Bucyrus-Erie tractor equipment, working side by side with competitive machines, has given an outstanding demonstration of the value of the experience and technical engineering built into each unit.

Their big pay dirt loads are evidenced by output figures and can be readily noted by watching the comparative length of cuts and the length of spread on the fills. Fast loading, fast dumping, ability to stay on top, easy maneuverability . . . all result in more trips per hour.

Rugged, scientifically designed construction provides steadiness of performance that means a lot in getting projects completed ahead of time, with less grief, and at exceptionally low maintenance cost.

Controls are easy to handle and control action on both cut and fill is so accurate as to save materially in time and expense of finished grading.

Before buying tractor equipment for dirt-moving be sure to get the full Bucyrus-Erie story. There is a complete line of blades, scrapers, rippers, rollers and grubbers that can show proved speed and economy for you. BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin, U. S. A.



On the Bloomington Indiana Airport this 6-yard Bucyrus-Erie scraper averaged 64 yards of white loam



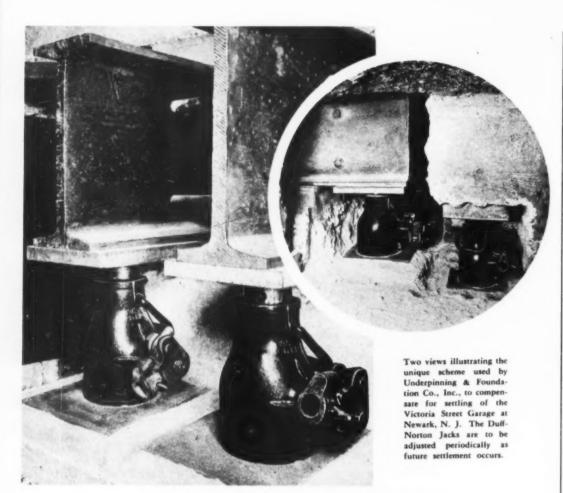
At West Palm Beach, Florida this TD-18 Bullgrader moved a thousand yards on average 300 foot passes per 8 hour day. Machine was also used to backfill trenches and fine grade runways.



This 8-yard scraper is one of three that did most of the grading on the Melbourne-EauGalie Airport, a 74,000 yard job in Florida.

BUCYRUS

See your International TracTracTor Distributor



# DUFF-NORTON JACKS OHSET SETTLING

DUFF-NORTON CONSTRUCTION JACKS



Almost 100 Duff-Norton Jacks have been installed by Underpinning & Foundation Co., Inc., of New York City to take up any future settlement that may occur in the city-owned garage at Victoria Street, Newark, N. J. The columns, wall girders, etc., have already been raised by means of the Duff-Norton Jacks, and further settlement will be compensated for by periodic jacking.

Construction engineers everywhere rely on Duff-Norton Jacks for dependability, easy action, long life. Made by the world's oldest and largest manufacturer of lifting jacks, Duff-Norton Jacks can be safely trusted to handle your heaviest loads. Let your Jobber show you the many types and sizes made specially for engineering and building construction service.

THE DUFF-NORTON MANUFACTURING CO.

CANADIAN PLANT

COATICOOK, QUEBEC

"The House That Jacks Built"

effort of hoist. Body floor, wider at rear than at front, to insure clean dumping, has center joint reinforced by butt-strap on underside of body. Double acting tailgate has offset hinges, manual control and chain spreader device. Easy sliding door is located in middle of tailgate. Box-section said to provide great strength and prevents spreading of corner posts. Positive acting twin-cylinder hoist raises and lowers body.—The Heil Co., Milwaukee, Wis.

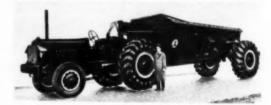


LUBRICATION BARREL PUMPS for heavy-duty use by contractors, in fleet garages and for motor bus maintenance are available in three types: (1) Volume barrel pump for 400-lb. oil drums operates with 40:1 piston delivering up to 6 lb. of regular semi-solid lubricant per minute; with 7:1 piston delivery is up to 15 lb. per minute; (2) for medium and smaller setups, grease pumps in both high and low pressure models are equipped to fit both 100- and 400-lb. oil drums; (3) air-operated motor oil pump fits on 55-gal. oil drum and delivers 5 gal. of S.A.E. 10 oil per minute and 3 gal. of S.A.E. 60 per minute. All these pumps are equipped with Dynamatic Primer enabling units to handle heavy fibrous lubricastings of fine argin.

cants with ease. All pump castings of fine grain cast iron said to be of high tensile strength. Wearing surface of cylinder is chrome-plate over cast iron.

—Alemite Division. Stewart-Warner Corp., 182 Diversey Parkway. Chicago, Ill.

SELF-POWERED EARTH HAULER, bottom-dump model, made primarily for contractor desiring to use larger loading units, has struck measure capacity of 21 cu.yd., heaped load capacity at 2:1 slope of 26.5 cu.yd. and is designed to carry payload of 60.000 lb. Powered with Cummins diesel 200-hp. engine. Equipped with Fuller fluid coupling and transmission and Lipe double 15-in. clutch. Has eight speeds forward ranging from 2.1 to 23.3 m.p.h. at governed engine speed with full payload and



two reverse speeds. Full-floating-type drive ax'e assembly has 3.15:1 ratio differential and 8.14:1 ratio planetary gearing, giving overall reduction of 25.7:1. Drive wheels ride on large tapered roller bearings mounted on 7-in. spindle and are connected to 4-in. drive axles by splined hub caps. Standard tire equipment includes 12.00x24, 14-ply truck-bus front tires and 24.00x32, 24-ply traction tread tires on drive and trailer wheels. Wedgeshaped trailer hopper. Bendix-Westinghouse air brake power and control equipment. Three-way universal tractor-to-trailer hitch. Other machines of this type have struck measure capacities of 9, 13 and 18 cu.yd.—The Euclid Road Machinery Co., Cleveland. Ohio.

TWO-DRUM POWER CONTROL WINCHES for operating cable-controlled equipment with International TracTracTors and other tractors has separate clutch and brake drums, and each drum has one heat-generating surface. Bands are external and contact 93.8 per cent of full circumference of drum, spreading friction pressures over large area so that

# YOU CAN'T BEAT VENTUBE\* FOR LOW COST VENTUATION



Nak the men up at the heading how important "Ventube" ventilating duct is! They'll tell you it helps them speed up work more and move along faster. Why? Because "Ventube" is light-weight and easy to handle. Sections nearest the face slide quickly back when blasting. Immediately afterward, they slide into place again, bringing clean, fresh air from the outside.



▶ All that is needed besides "Ventube" to insure best ventilating is a motor-driven fan of proper capacity. There's no expensive machinery to buy . . . No massive equipment to move from job to job. Notice how "Ventube" hangs as straight as a string. There are no kinks or bulges in the smooth interior to impede the flow of fresh air. And that holds true even when "Ventube" goes around corners and up and down steep inclines!



▶ One man can install an entire system of "Ventube" within a few hours. Time-saving detachable couplings make joints air-tight and reduce air loss to a minimum. When the job is finished, it's easy to lift the hooks off the wire, roll up "Ventube" and carry it to the next job. You'll find "Ventube" is the cheapest, most effective way yet found to ventilate your tunnel.



▶ "Ventube" is amazingly durable! It is made of extraheavy, long-fibered cloth woven to high Du Pont standards. It's both coated and impregnated with a special composition that won't peel off. "Ventube" resists acid water, gases, fungus and moisture. And "Ventube" is made as strong in the warp direction as in the filler so it can resist tearing and rupture. Write Du Pont today for facts and figures on "Ventube."

### Du Pont also makes powder bags

from the same sturdy, rubberized material as "Ventube" ventilating duct. They're compact but roomy—and available in several serviceable sizes. Write Du Pont for prices and complete information today.

"'Ventube" is Du Pont's reg. trademark for its flexible ventilating duct.

Be sure to tune in..."Cavalcade of America" NBC Red Network...every Monday





E. I. DU PONT DE NEMOURS & CO. (INC.)

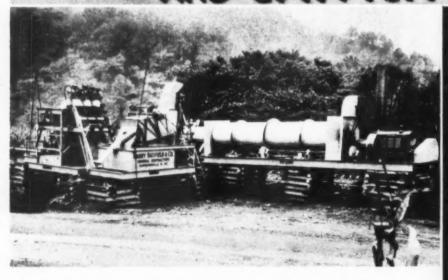
"FABRIKOID" DIVISION, FAIRFIELD, CONNECTICUT

THE FLEXIBLE VENTILATING DUCT



In stock at New York, Hartford, Philadelphia, Harrisburg, Baltimore, Atlanta, Birmingham & Los Angeles GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK - DISTRIBUTORS EVERYWHERE





The new model MH plant - in three units - all wheel mounted and all remaining on the ground during operation. Full size 2500 pound pugmill mixer—dial aggregate scales—fluidometer system—ample dry-

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ing capacity. Will meet state and federal plant specifications.

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less heat is generated at any one spot. All bands and drum friction surfaces exposed to open air to assure prompt heat dissipation. Thus, according to designers, heat is carried off before it can build up to temperatures which would damage linings, ruin oil seals or cause excessive expansion or contraction oil seals or cause excessive expansion or contraction with its resulting effect on clutch and brake adjustment. Wide, large-diameter external clutch and brake bands are interchangeable. One adjustment on each band said to compensate for wear. Bands may be replaced in field with ordinary tools and without disturbing oil seals or bearings. "Cushioned" starts and stops lengthen rope life and protect tractors and equipment. Rope life said to be further safeguarded by large-diameter, properly further safeguarded by large-diameter, properly aligned sheaves and long lead angle to assure smooth reeving of drum. Swinging fanlead sheaves and to stay properly aligned with lead cable even on short turns.—Bucyrus-Erie Co., South Milwaukee, Wis.

**LOCKING NUT** has bolt gripping element consisting of slightly elliptical shaped spring-steel retainer permanently seated in head of standard nut. When nut is applied, retainer is distorted from elliptical to circular shape, thus setting up powerful spring pressure between bolt and retainer threads. Ap-



plication and removal may be made without injury plication and removal may be made without injury to threads. Nut is started on bolt with fingers and wrench used when threads of retainer start to engage threads on bolt. Makers claim that nut can be tightened up or backed off part way years after its application and still retain grip on bolt; also may be taken off and re-applied numerous times without losing its gripping power.—Security Metal Products, Inc., 370 E. Kalamazoo Ave., Kalamazoo Mich

## EVEN MODERN BUS FLEETS CAN PROFIT BY USING THIS AUTOMOTIVE ENGINEERING SERVICE...

The bus pictured below is far from being old. It's typical of the equipment operated by a Minnesota bus line. And the help which this operator received in solving his problems is typical of the service Standard Oil Engineers have for any operator.

In this case, the Engineer was asked to locate the cause of troublesome engine deposits. At the same time he carefully checked other engine conditions. Modern testing equipment enabled him to make a complete and accurate analysis.

When he finished working with this maintenance department, not only had the deposit trouble been eliminated, but fleet gasoline mileage had been increased from 10.2 to 11.2 miles per gallon.

Why not have one of these Engineers explain to you just how he works and what he does to make these savings? You'll not be obligated in any way.



## CONTRACTOR AWARDED FREEDOM FROM WHEEL BEARING TROUBLE

Gasoline mileage is a big item in fleet operation, but Standard Oil Automotive Engineers find many other ways of saving fleet operators money. One of these Engineers noticed that a Minnesota contractor was replacing front wheel bearings frequently in trucks and road machines. In analyzing this job the Engineer found that heat, transmitted from the brakes, was thinning out the grease in use. He recommended a test of the right grade of Standard Wheel Bearing Grease. The test showed that this grease eliminated bearing failures and also considerable expense in brake relining caused by grease leaking onto the brake drums.

One of these Engineers may have many cost-saving suggestions to offer you, if you'll let him.



## HERE IS ONE SAFE WAY TO REDUCE FLEET FUEL COSTS

Even a fraction of a cent difference in the *price* of gasoline is interesting to most fleet operators. But there is always a gamble on quality when buying on price alone. And why gamble when there is one *safe* way to get lower gasoline costs?

Here's all you have to do. Let an Automotive Engineer "put" the right grade of Standard Oil gasoline on your trucks. That doesn't mean just filling the gas tank. He'll check your equipment and help your maintenance men adjust it to get full power and economy from the fuel he recommends. He will help locate engine inefficiencies.

This service on a fleet of eighteen trucks in an Evansville fleet reduced gasoline consumption 18%. That meant a saving equivalent to almost 2c per gallon in this fleet's gasoline bill.

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The Laughlin drop forged Safety Clip grabs wire rope with a grip like a fist—a vise-like, solid clench that stays put. When removed, it leaves the wire rope straight, uncrimped, ready to use again.



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These tests are described in a new booklet — which also gives other advantages to be gained by using Laughlin Safety Clips. Fill out the coupon below — and mail today. No obligation.

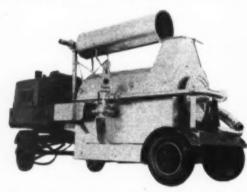
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PORTABLE, ROTARY OIL RETORT, designed to provide speedier method of heating oils and asphalt in tank cars, is said to increase temperature of 10,000 gal. of oil at rate of 60 deg. F. per hour, requiring ordinarily only about 2 hr. to prepare car of oil for unloading. Circulation in retort is aided by rotating



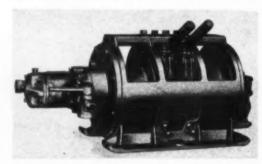
coils to such extent that uniformly progressive heating is obtained without "hot zones" and hence, without danger of forming carbon or cracking oil. Oil is first circulated through retort at rather high speed until its temperature reaches 315 deg. F. Then slower circulation follows making it possible to start loading out at 450 deg. F. in about 2 hr. As temperatures in tank car increase, rate of pumping can be speeded up to about 260 g.p.m.—Dallas Machine & Locomotive Works, Dallas, Ore.

super EARTH-MOVING MACHINE. high-speed, rubber-tired unit, designed to meet construction needs of larger, long haul jobs, is powered either by 130- or 150-hp. 6-cylinder diesel engine, utilizing this power to increase production per hour by pulling larger capacity Carryall with struck capacity of 12.1 and heaped of 15 cu.yd. Use of this unit said to increase production 35 per cent, to decrease



costs and to earn more profit. Super Tournapull, as machine is called, uses power of pusher unit to cut loading time and to heap on capacity loads. Said to attain high gear hauling speeds up to 15 m.p.h. Standard equipment includes hydraulic brakes, front crankcase guard with pull hook, front bumper, electric lights, starter, horn and cab. Tire equipment: Tournapull, two 21.00x24-in. pneumatic tires and carryall scraper, two 18.00x24-in.—R. G. Le Tourneau, Inc., Peoria, Ill.

LIGHTWEIGHT SCRAPER HOIST, designed especially for small scraping jobs in thin, narrow veins or stopes, irregular veins, crosscuts, for spreading wastes and for development work, has cable pull of 650 to 1,000 lb. and cable speed of 125 to 150 f.p.m. Either air or electric drive available. "Multi-



vane" type motor with governor which limits free speed and conserves air. Construction details include: Individual clutch lever control for each drum; no tools required to make clutch adjustment; gears, totally inclosed, operate in grease; anti-friction bearings support all rotating parts; helical stub-tooth gears provide smooth, quiet operation. Weight 250 lb., without cable guides. Compactness allows it to be passed through 13x15-in. opening. — Ingersoll-Rand Co., 11 Broadway, New York City.



Wet Rubbing A Wall With Concrete Surfacing Attachment

The speed with which these MALL efficient 9-Job power units pay for themselves will surprise any contractor. They are easily portable . . . can be operated anywhere . . are easy to keep busy . . and provide dependable, low-cost power for Concrete Surfacing, Concrete Vibrating, Form Sanding, Sawing with Circular or Chain Saw, Drilling, Pumping, Grinding, Sharpening Tools and Wire Brushing. Single-purpose machines that work only part time eat up profits. Why risk this loss when a MALL portable power unit will give you all the advantages of 9 single purpose machines at lower cost? In addition, a national network of MALL distributors, agents and district offices

in all principal cities assures you of prompt service regardless of where YOUR job is located. Write Today for full details and ask for a Free Demonstration.

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## MALL TOOL COMPANY 7757 SOUTH CHICAGO AVENUE CHICAGO, ILLINOIS

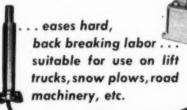
\* We make over 200 gasoline engine, air and electrically operated tools and attachments.



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## "COMMERCIAL"

NEW, MANUALLY OPERATED POWER and CONTROL UNIT



• A sterling example of COMMERCIAL Hydraulic Equipment development is this new power and control unit. In two styles, three sizes in each style, it gives pressures up to 3,000 lbs. per sq. inch. Compact, easy to install, this unit is of quality manufacture and materials throughout. The first type is a single attachment... pump and tank in one. The second type comes with pump and tank separate, and high pressure hose connections. Mount them in the cabs of your trucks or road machinery... or any place where space is at a premium... they'll come in handy on numerous occasions. Moving parts are few... maintenance, practically nothing. Investigate this new unit's possibilities. It's been tested for more than a year under actual operating conditions. Prices and details will be sent you upon request — urite!

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Modern CRANES and SHOVELS

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- open end
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- Detachable
   Socket
- Construction
   Ratchets

There are ARMSTRONG Wrenches for your every need and each is the finest tool of its

ARMSTRONG Socket Wrenches extensions and handles are Chrome-Vanadium Steel. Ratchets are drop forged steel and the patented ARMSTRONG Drivelock locks sockets, driver, ratchets and handles to each

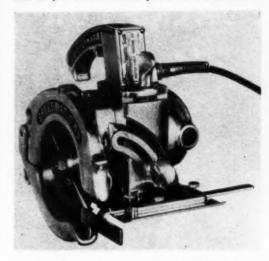
other - will not knock or pry apart, sockets can not fall off.

ARMSTRONG Giant Construction Ratchets are drop forged steel. Nut sockets are machined from solid bar stock.

ARMSTRONG Drop Forged

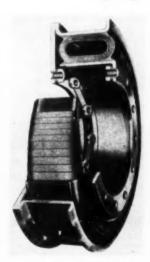


LIGHTWEIGHT HIGH-SPEED ELECTRIC HAND SAW carries 61/2-in.-diameter blade with cutting capacity of 2-in. material and weighs 151/2 lb. Blade travels at 7,200 r.p.m., said to produce cutting edge speed in excess of 2 mi. per minute. Through use of helical cut gear drive in this tool, maker claims that 98 per cent of motor power is transmitted to



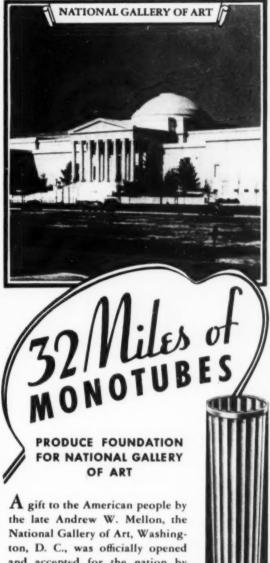
drive shaft in comparison with usual 76 per cent delivered in worm gear driven high speed saws. Equipped with ½6-hp. Universal motor. Base raises and lowers for depth adjustment and tilts to 45 deg. for bevels. Cast-in and enameled graduated scale. Die cast aluminum frame. Standard equipment includes combination saw blade, ripping guide, crosscutting guide, 15-ft. insulated conductor cable with plug and socket, metal carrying case and blade change wrench.—Porter Cable Machine Co., Syracuse, N. Y.

NEW TYPE OF RUBBER HOSE called Condor Homo-Flex, is claimed to combine balance, homogeneity, and flexibility to a high degree. According to its manufacturer, Homo-Flex principle of balanced engineered construction was first applied to conveyor belts and because of unusual service and high tonnage records resulting on all types of conveying jobs, engineers experimented in applying this principle in hose design and after months of exhaustive field tests under severe conditions, Condor Homo-Flex hose line was developed. Among advantages claimed for this hose are: extreme flexibility, lightness in weight, ease of handling, inseparable covers and plies, uniform diameters, and less elongation and expansion. Condor Homo-Flex is manufactured in 50-ft. lengths on accurate steel mandrels in several types that cover wide variety of service. Among these are air hose, water hose, high pressure orchard spray hose, mine spraying hose, air-oil and oil spray hose, and steam pressing iron hose.—The Manhattan Rubber Mig. Div., Raybestos-Manhattan, Inc., Passaic, N. J.



FOR CONNECTING DIESEL. OIL GASO-LINE OR GAS ENGINES to any kind of driven equipment or for use with electric motor-driven equipment involving fluctuating torque, Airflex coupling, by control of air pressure in rubber gland, is designed to provide degree of resiliency that can be readily changed to suit exact requirements of particular application. Coupling, as illustrated, consists of special resilient rubber gland, gland lining of premolded, prevulcanized cylindrical section specially treated to prevent

ly treated to prevent air loss, multiple layers of durable fabric and live rubber, steel inner and outer rims bonded to gland and standard thread, specially designed Schrader valve taking any pump hand fitting or air nozzle. Degree of elasticity of coupling can be varied by changing air pressure to which gland is inflated. Coupling is available in number of sizes to suit individual operating conditions.—The Falk Corp., Milwaukee, Wis.



A gift to the American people by the late Andrew W. Mellon, the National Gallery of Art, Washington, D. C., was officially opened and accepted for the nation by President Roosevelt on March 17. It will serve as a permanent home for the Mellon and Kress collection of world famous paintings and art objects.

Supporting the foundation of this building are approximately 7000 Monotubes, representing 32 miles of piling. All of these steel casings were driven to 35-ton bearing and filled with concrete in less than the specified 90-day period.

Installation of cast-in-place concrete piles by the Monotube Method offers the same time and moneysaving advantages to small and large jobs alike. These cold rolled steel casings reduce handling time and driving costs to a minimum because they are light in weight and can be driven without a mandrel by a crawler crane equipped with standard leads and hammer. Monotubes are inspected easily after driving and are available in a gauge, taper and length to meet all soil conditions. Write for copy of Catalog No. 68A.

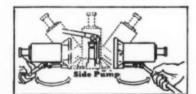
THE UNION METAL MANUFACTURING CO. CANTON, OHIO



There's a rugged, dependable Blackhawk Hydraulic Jack in just the right size and type to meet every construction need — to take care of today's demands for faster construction — to eliminate tie-ups, time losses and breakdowns.

Blackhawk Hydraulics are handier to use—easier to position and operate than mechanical types. Also more efficient—deliver 94% operating efficiency, as compared to 12% to 30% for screw-type mechanical jacks. SAFER—no teeth to sheer and suddenly drop load. Save expense, too—pack more power per dollar than any other type—often pay for themselves on first big job! Send coupon today for new catalog!

A Product of BLACKHAWK MFG. CO. Dept. J2351 Milwaukee, Wis. ONLY BLACKHAWK JACKS ARE TAGGED WITH THIS SEAL OF SERVICE-PROVED QUALITY AND DEPENDABLE PERFORMANCE.



#### **EXTRA UTILITY**

Blackhawk Design adapts jacks to more jobs. Full power at any angle from vertical to horizontal—because pump is on the side. Handle extends outward toward operator (not toward floor), permitting horizontal operation at floor level.

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	Send new catalog featuring Blackhawk Hydraulic Hand Jacks. Gauge-Equipped Jacks. Porto-Power Remotely Controlled Jacks. Pipe Benders and Wrenches.
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NEW CONCRETE VIBRATORS for use with 220/440 v., 3-phase current has standard motor equipped with V-belt countershaft and pulleys which makes possible desired speeds of 3,450 to 6,800 or as high as 8,000 r.p.m., for vibrating concrete. This supersedes old model which was powered by standard



speed motor having geared head set-up for high speeds. For 110/220-v. current lightweight universal motors are provided. Advantages claimed: Ease of servicing standard motors; driving speeds changed by using different size pulleys; drive is less severe on driven parts of apparatus than when using geared heads. All drive sections and vibrators interchangeable and can be opened up for inspection. Sections can be coupled together in any multiple, said to be exclusive feature, and are supplied in 7- and 12-ft. lengths.—White Manufacturing Co., Elkhart. Ind.

NEW 97 HORSE POWER ENGINE is now offered as standard equipment in all 2-ton GMC trucks, and is also available at slight additional cost in GMC 1-1/2-ton models. According to makers new engine has a displacement of 236 cu.in., developing 97 hp. at 3,200 r.p.m., and 192.5 lb./it. torque at 1,000 r.p.m. It is claimed that this engine offers greater torque or pulling power than any other engine of its size in light duty truck field. High torque of this latest "super duty" engine to join ranks of valve-in-head engine line has been attained through development of high-lift cam—with properly coordinated engine timing—which permits more complete utilization of high power and economy advantages claimed as inherent in Turbo-Top piston and combustion chamber design. — General Motors Co., Detroit, Mich.





STREAMLINED WELDING
GLOVE is made from
chrome tan horsehide and
from "gun-cut" pattern
with no searms exposed to
active wear. All seams excepting those at base of
second and third fingers
are at back of glove and

second and third fingers are at back of glove and these two are well reinforced as well as thumb and index finger. Back of glove is one piece, removing any chance of seam breakage under extreme heat. Inside insulated with wool. Size 14 in. overall, 5 in across palm with 6-in. gauntlet.—American Optical Co., Southbridge, Mass.

## THE OUTSTANDING DEVELOPMENT FOR CONCRETE PAVING of Roads Airports ... the new Blaw-Knox

SPREADER-VIBRATOR

## CONCRETE SPREADERS VIBRATORS ROAD FINISHERS

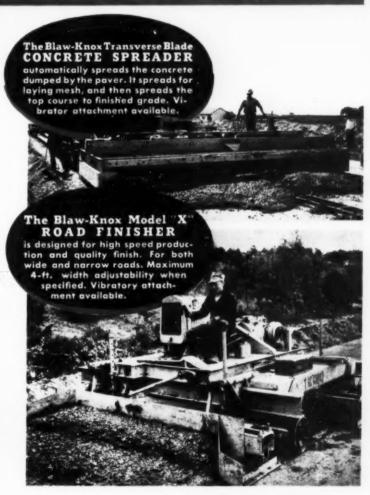
Introduction of the Blaw-Knox SPREADER-VIBRATOR marks a new trend in road paving methods now, concrete of 1/2-inch and 3/4-inch slump can be quickly and successfully compacted, surfaced and finished.

This new equipment, which provides an entirely new method for high speed, quality concrete paving construction, has aroused decided interest among highway engineers and contractors throughout the country. It's the most outstanding development in recent years for the paving industry.

Mechanized Blaw-Knox equipment will build roads faster, cheaper and better. Get full information about Blaw-Knox Transverse Blade CONCRETE SPREADERS; SPREADER-VIBRATORS: Model "X" FINISHING MACHINES and VI-BRATORY FINISHERS for wide or narrow roads.

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## You Get EXTRA "BACKBONE"in a ROGERS TRAILER

ROGERS TRAILERS have uncommon basic strength and an extra liberal factor of safety - yet they pack no excess weight.

Scientific design based upon long experience, alloy steel and electric welding produce trailers that have envious record for long service with remarkable freedom from repairs.

The uniform design of all standard trailers incorporates two deep structural main members or "backbones" which extend from the rear to the gooseneck. These liberally proportioned members are further strengthened and stiffened as each additional piece is

In your own interest, investigate this fundamentally important matter of frame design before buying a trailer. Write for literature.

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--for lighting, powering hand electric tools, or operating other construction equipment.

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Available in all sizes from 250 to 25,000 watts, A. C. or D. C.; portable or stationary models, operating on your choice of fuel.

Universal Electric Plants are not merely. "assembled." Every Universal "matched unit" lighting plant is properly engineered to assure the utmost in dependable current.

They are simple to operate, economical to one. And in most cases, they deliver reliable electric current at less than local utility rates. Many thousands of Universals are in the United States Government service. At right are several of the Universal models which are widely used in the contracting field.

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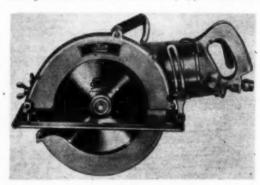
346 Universal Drive, Oshkosh, Wisconsin

44 Warren St., New York, N. Y.

DEÄLERS: Some excellent territories are still apen. Write for details about selling the UNIVERSAL Line.

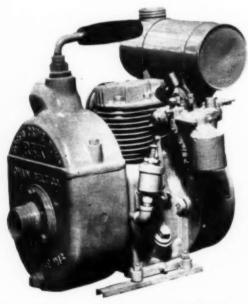


PNEUMATIC SAW with 12-in diameter blade is designed for use by contractors on cutting heavy timber. New Thor unit will rip and cross-cut timbers up to 4 in.; full and bevel cut 3 5/16-in. lumber at 45 deg. Flexible connection to rotary type motor dis-



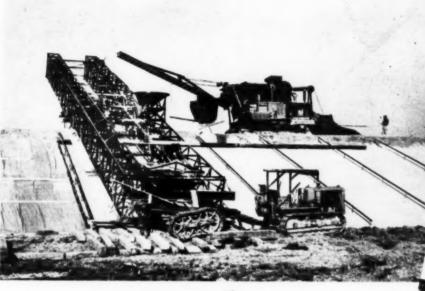
sipates shock resulting from load vibrations. Live air is directed below rotor blades to provide instant starting. Throttle has positive safety lock to prevent accidental starting of saw. Automatic telescopic guard on ball-bearings shields saw blade when not guard on Ball-Bearings shields saw blade when het cutting. Blower keeps line clear of sawdust. Weight, 30 lb.; overall length, 22 in.; operates at 1,200 r.p.m.—Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago. Ill.

LIGHTWEIGHT CENTRIFUGAL PUMP. 3,000 g.p.h. capacity and weighing 54 lb., is equipped with Rex "peeler," device said to peel air from whirling impeller and thus speed up prime. Has semi-steel recirculating water chamber equipped with aluminum cap to save weight. Powered by single cylinder air-cooled engine ¾ to 1 hp., and equipped with auto-



matic governor which speeds up motor when pump catches its prime and starts to lift water, thus elimcatches its prime and starts to lift water, thus eliminating possible strain on power unit at low speeds and assuring economical performance. Designed originally for contractor use, it is now said to fill needs of utility companies, municipal and county sewage commission and in other fields where lightweight machine is needed. Overall dimensions: 151/4 in. long by 113/4 in. wide by 153/4 in. high.—Chain Belt Co., Milwaukee, Wis.

**HEAVY-DUTY VISE STAND**, designed either for portable or stationary use, has spread of 50 in. in front and 43 in. from front to rear leg, measures 14 in. in width and depth, has tool notches and slots around rim, oil can recess and special "dope" pot. Equipment also includes three benders, one for  $\frac{1}{4}$ -in. pipe and reverse benders for  $\frac{1}{2}$ - and  $\frac{3}{4}$ -in. pipe placed directly over right front leg to prevent tipping during bending operation. Unit has ceiling brace and its feet are punched for attaching to floor. Also may be used with maker's new skidless rubber "shoes" that prevent skidding or scratches on highly polished floor. Vise has double-quick screw with frictionless disk to protect fast-moving tip. One piece slide rides on outside of frame. Vise HEAVY-DUTY VISE STAND, designed either for



A Job for a SPECIALIST

When a special traveling concrete plant was needed to spread 92,000 cu.yds. of concrete in a 10-inch layer on the 21/2:1 earth embankment slope (85 ft. from toe to crest) of the North and South Santee Dams - a South Carolina flood control project - the job was entrusted to Insley because Insley is equipped from every standpoint - men, materials and machines - to handle the unusual jobs . . . because Insley has for 36 years specialized in building construction equipment that does the job economically and dependably.

EXCAVATORS - Because of exceptional speed and proven reliability, the Insley K-10 and K-12 are playing an important part in the rush of defense work. In the small shovel field, Insley was the pioneer, and today, still specializes, and are exclusive builders of 3/8 and 1/2-yard machines.

READYMIX RECEIVING BUCKETS - Have repeatedly proven to be the fastest, most economical method of handling concrete, direct from truck to forms, where hoisting equipment is available.

INSLEY MANUFACTURING CORPORATION, INDIANAPOLIS, INDIANA



Williams' offer you more for your wrench dollar . . . more in design, more in utility, more in strength and performance! And that goes whether you need Open-end Wrenches, Reversible Ratchet Wrenches, Detachable Socket Wrenches, or special Wrenches for steel and construction workers. The reason is that Williams have been making quality wrenches for more than half a century. Their drop-forg-ing experience is equalled by no other wrench manufacturer in the country. Williams' re-search, design and production facilities are everything that you would expect of the one manufacturer producing the world's most com-

plete line of wrenches. Williams' line includes both carbon and alloy steel types-more than 50 patterns, over 1000 standard sizes. If you want today's greatest value for your wrench dollar, investigate Williams' "Superior" Wrenches — drop-forged from improved carbon steel — approximately twice as strong as old-fashioned wrenches of this type. They cost no more than ordinary tools yet are practically as strong, size for size, as higher priced wrenches of alloy steel.

Industrial distributors everywhere sell illiams' Wrenches. Write for informative. Williams' Wrenches. Write for informati booklet "How to Select and Use Wrenches."



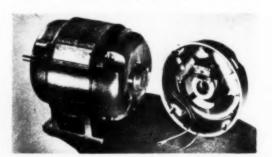
jaws are heat-treated by patented process and have hard teeth accurately spaced to hold each size of pipe. Each tooth undercut to prevent filling up with scale.—Armstrong Míg. Co., Bridgeport, Conn.

SPECIAL GENERATOR ATTACHMENT for magnet operation is now being supplied for use with ¾-yd. Paymaster crane providing an efficient unit for handling scrap iron and ingots. Crane is lightweight, streamlined machine designed especially for general construction, brick plants, railroad work and truck crane service. Features: (1) Weight kept to



minimum by use of modern steels and by placing machinery in position to obtain maximum stability;
(2) internal expanding band-type, toggle operated swing clutches with housings 17 in. in diameter by 6 in. wide; (3) anti-friction bearings at every vital bearing point, including drums; (4) boom hoist is separate unit mounted on rotating base casting and is independent in operation; (5) said to work equalis independent in operation; (5) said to work equal-y well as shovel, clamshell, dragline or pull shovel. —Lima Locomotive Works, Inc., Lima, Ohio.

CAPACITOR MOTOR of "Tri-Clad" line features modern appearance, better mechanical and electrical protection and insurance against operating wear and tear. May be obtained either with ball-bearing and tear. May be obtained either with ball-bearing or sleeve-bearing construction in two types. KC for applications requiring moderate starting torques such as fans, blowers and centrifugal pumps; KC] for compressors, loaded conveyors, reciprocating pumps and any other applications requiring high starting torque. Capacitors mounted inside end shield on normal-torque motor. On high starting





# To Get Better Service from the Wire Rope You Use—

Assuming that you have bought and have had delivered to you the size, grade and construction of wire rope suitable for your work and equipment, the actual service you obtain from that rope—regardless of what the rope is capable of doing—will depend largely upon the following:

(1) How the rope is handled from the time it is received until it is installed.

(2) The condition of the equipment on which the rope is to work, at time of installation.

And here are some "Dos" and "Don'ts" that should prove valuable.

Right



Reels and coils of wire rope should not be dropped from car or truck

If iron bars are used to move reel, prying should be done under the reel flange and not against the rope.

when being unloaded.



If rope is not put into service when received, see that it is stored in a place protected from weather and free from acid fumes.

Use care when uncoiling or unreeling, so that the rope will not loop and form a kink.



.2.

Before a new rope is installed, make a thorough check-up of the equipment on which it is to work, to make sure



- -that sheave grooves are of correct size and design.
- that sheave grooves are free from corrugations.
- that drum, sheaves and idlers are in line and properly lubricated so they will rotate freely.
- that there is no excessive fleet angle.

Wrong









Unless you give your wire rope a fair chance, it will not give you the full service of which it is actually capable. In order to help all wire rope users obtain maximum efficiency from their wire rope, we publish a booklet "Practical Information on the Use and Care of Wire Rope," which covers many other conditions that deserve consideration. We would be glad to send a complimentary copy to any one interested.

## A. LESCHEN & SONS ROPE CO.

5909 KENNERLY AVENUE

NEW YORK / / 90 West Street
CHICAGO / 810 W. Washington Blvd.
DENVER / 1554 Wazee Street



ST. LOUIS, MISSOURI, U. S. A.

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## WELDED

ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and SPEED



"I have been operating crames for 10 years." writes A. G. Grupe, veteran crame operator for the Edison Fuel and

Materials Co., Chicago, "and have never used a better bucket. The boss always has a big smile when he sees me come up with material spilling over the sides."

Operators and bosses all prefer Williams. Williams Welded Construction means longer wear . . . less breakage; faster work . . . more yardage! Williams buckets operate year in and year out with practically no cost for maintenance and repairs.

Prompt delivery and service through nation-wide distributors. Write for Free Bulletins on any of the 11 types of Williams buckets.

THE WELLMAN ENGINEERING CO. 7017 Central Ave., Cleveland, Ohio

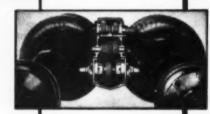
WILLIAMS Buckets

# HAUL BIGGER LOADS

#### **GET MORE TRACTION**

Two axles under the load are far better than one! THORNTON Four-Rear-Wheel DRIVE doubles capacity and tractive effort.

- Cuts investment 25-40%.
- Reduces upkeep 30-50%.



Saves money for operators in scores of industries.

## THORNTON TANDEM CO.

Manufacturers also of the THORNTON automatic-locking DIFFERENTIAL which gives traction when slippery going makes trucks equipped with ordinary differentials helpless.

"When you need TRACTION you need THORNTON"

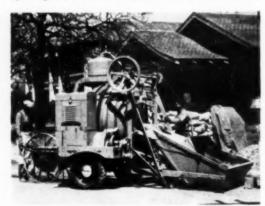
torque motor  $1\frac{1}{2}$  hp., and larger, capacitors are mounted in compact case on top of motor frame. Features: (1) Complete mechanical protection through use of cast-iron frame; (2) electric protection made possible by use of Formex wire in magnet coils; (3) improved bearing design and lubricating arrangements. Also utilizes cast-aluminum rotor and double-end ventilation. Clearly marked terminals permanently identity leads. Graphic, easy to read stainless steel connection plate shows external connections.—General Electric Co., Schenectady, N. Y.

TRUCK MIXERS AND AGITATORS, in three sizes, 2-, 3- and 4-yd., known as "High Dump" line, are designed with high discharge point to meet unusual placing conditions, to deliver concrete over wider radius, to spout it into higher forms, over material piles and into large floor hoppers. Features: (1) Extra large drums permit one-shot charging and provide extra capacity and ample void space for proper mixing when drum is fully loaded; (2) dual-mix action said to insure higher strength



concrete, throw-back blades picking up material and hurling it into center of mass, giving complete end-to-end mix; (3) vacuum-operated discharge door, easily opened, closed and controlled; (4) sypho-meter tank with "winter safety" water booster said to measure water accurately within ½ of 1 per cent unaffected by splashing or surging of water in tank; (5) cab-controlled truck engine drive operated by valve located in cab; mixer may be cut out for traffic stops and heavy grades or rotation of drum may be reversed by flick of valve; (6) two-speed, shock-proof transmission provides high speeds for quick mixing on short hauls and slow speeds for long hauls or agitation. Two-yd, size may be mounted on short wheelbase trucks such as 134-in, wheelbase Ford. Units have 50 per cent greater capacity as agitators.—The Jaeger Machine Co., Columbus, Ohio.

END DISCHARGE TRAILER-MIXER 14-cu.ft. capacity, known as "Dandie Trail-Mix," is recommended by its makers to contractors having scattered jobs because it can be moved at high speed, can be spotted quickly on job to pour directly to forms, chute or concrete carts. Advantages claimed: (1) Narrow, light and easily handled—no time lost in spotting; (2) absence of obstructions at end or sides



of skip allows full movement for shoveling or wheelbarrow loading; (3) separation of members forming tow bar provide safety guards for skip; (4) skip and skip-flow shaker designed to permit aggregates to flow freely and quickly into re-mixing, free rolling drum; (5) handling of discharge chute facilitated by gear reduction and large hand wheel; (6) pneumatic tires and full spring mounting absorb all operating and travel shocks. Powered either with air or radiator-cooled engines or with electric motor. V-belt drive.—Koehring Co., 3026 West Concordia Ave., Milwaukee, Wis.

# Construct the Airport's runways with ASPHALT for these important reasons: Runways, parking area and half the hangar apron at la Guardio Field, New York City's principal airport, are paved with Asphalt Penetration Macadam; 3,000,000 gallons of Texaco Asphalt were used.

There is a type of Texaco Asphalt runway for every airport.

#### HEAVY-DUTY TYPES

- (a) Texaco Sheet Asphalt
- (b) Texaco Asphaltic Concrete (hot or cold laid)
  (c) Texaco Asphalt Macadam (penetration type)

#### INTERMEDIATE TYPES

- (d) Plant-mix type, using Texaco Cutback Asphalt or Slow-curing Oil
- (e) Travelling plant-mix type, using Cutback or Slowcuring Oil
  (f) Mixed-in-place type, using Cutback or Slow-curing

Have a Texaco field engineer recommend the runway type called for by your airport. Your request for his cooperation entails no obligation

- Asphalt runways are resilient. Their ability to absorb heavy impact increases their life span and reduces maintenance
- Asphalt provides a variety of types of runway construction, one of which will satisfy most economically the particular needs of each airport.
- Asphalt runway surfaces readily maintain contact with the subgrade, an important factor when airports are construct-
- Asphalt runways are highly skid-resistant in wet weather, as well as in dry.
- Asphalt runways are unaffected by seasonal variations in temperature.



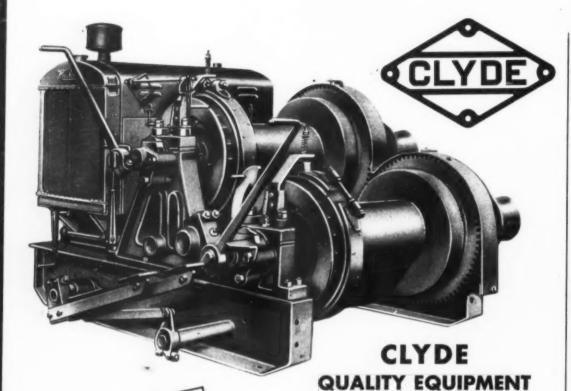
THE TEXAS COMPANY, Asphalt Sales Department, 135 East 42nd St., New York City

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Clyde hoists are scientifically engineered to provide the utmost in efficiency, safety and economy of operation. Every piece that goes into these machines is carefully designed for its particular load and purpose . . . strength is obtained without useless, dead weight . . . economy without sacrificing performance.

Check these Clyde features . . . compare the values.

All steel, electric welded, one-piece beds, extremely rigid. Double cone fric-

beds, extremely rigid. Double cone frictions, smooth, positive and easy acting. One piece drums with barrel, flanges, friction and brake surfaces machined for more efficient operation. Operating levers grouped for convenient manipulation. Semi-steel side stands with wide bearing surfaces. Gears with machine cut teeth, keyed and pressed on shafts. High-grade shafting turned and ground to exact size.



#### REPAIRING

## Giant "Molars"

are meeting problems of repair and maintenance with Tournacar welders—GMC panel trucks equipped with portable Lin-

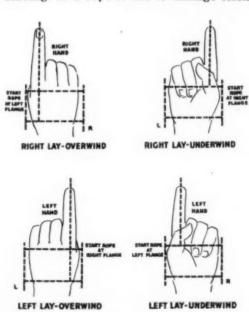


coln welders. In the accompanying photograph a serviceman for the J. D. Pittman Tractor Co. is repairing giant "molars" of a shovel dipper in use near Ft. Payne, Ala.

## Drum Reeving

#### SIMPLIFIED

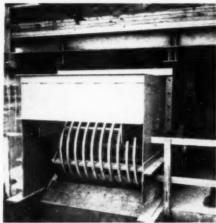
THERE IS A RULE, a rather complicated one, that tells at which drum flange to start roping a smooth drum. If started at the proper flange the rope will wind with the wraps tightly hugging each other. It will so wind itself on the drum that there will be no space between wraps into which a wrap from the layer above might squeeze and cause serious scrubbing, scarfing or binding. If a rope is not to damage itself



YOU'LL TAKE PRIDE IN YOUR CLYDE

Gasoline Hoist Sixes

## WATER FOR NEW YORK CITY



View of one of plant's two 36"x6' Telsmith Reciprocating Plate Feeders, and No. 540 Telsmith Rotary Grizzly.



Plus 4" gravel goes to a No. 16-B Telsmith Gyratory Primary Crusher. Minus 4" gravel and sand is by-passed.



One5'x12' Double Deck and two5'x12' Telsmith Triple Deck Pulsators act as scalping, preliminary sizing and sand separating screens.



One of the two No. 36 Telsmith Gyrasphere Crushers producing minus 1½" or minus ¾" product as required.





Two 72" x 10'6" Telsmith Super-Scrubbers thoroughly clean the gravel, and eliminate any clay or soft stone.



Two 3'x 8' Telsmith Double Deck Screens rinse and size the gravel. The lower 11/4" deck dewaters the gravel.



Telsmith Steel Frame Belt Conveyors take finished sand and gravel to steel bins equipped with Telsmith Bin Gates.

The state of the s

Processing 800,000 cu. yds. of concrete aggregates for the big Delaware Aqueduct. And meeting the tough specifications of the New York City Board of

Water Supply— $1\frac{1}{2}$ " and  $\frac{3}{4}$ " gravel, and minus  $\frac{1}{4}$ " sand with no crusher grits. A big job! And it takes a big tonnage plant! The Rossoff Sand & Gravel Corp. has just such a plant near Kerhonkson, N. Y

In co-operation with Mr. Samuel R. Rossoff and his engineers, this new and completely modern plant was designed by Telsmith. Telsmith built the machinery...

supervised its installation...co-ordinating and balancing every unit. And the plant is turning out its required tonnage every hour. Telsmith sound engineering experience, Telsmith high grade equipment, and Telsmith centralized responsibility, here as in so many other plants, delivered all-around satisfactory results.

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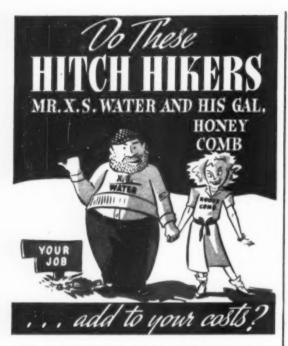
Wilson-Weesner-Wilkinson Co. Knoxville and Nashville, Tenn. Brandeis M. & S. Co. Louisville, Ky. G. F. Seeley & Co.

Toronto, Ont.

Charleston Tractor & Eqpt. Corp. Charleston, W. Va.

Roanoke Trac. & Eqpt. Co. Roanoke, Va. North Carolina Eqpt. Co. Raleigh and Stateville, N. C.

May 1941 - CONSTRUCTION METHODS - Page 101



These two pals are costly trouble makers - on any concrete job-if you let them in!

## **POZZOLITH**

added to any practical mix eliminates up to 331/3% of the excess water in the concrete. Yet placeability—mobility and cohesiveness are increased thus avoiding honeycombing.

Only POZZOLITH has these 3 vital actions,—(1) disperses cement particles (2) cuts total mixing water up to 20%, (3) produces maximum strengths.

By using POZZOLITH you get easier, quicker placeability, your forms strip sooner and cleaner ... You save on reduced refinishing costs, freedom from honeycombing and segregation.

Get rid of Mr. X. S. Water and his gal Honey Comb at the start,—and save money!

#### **HOW POZZOLITH WORKS**

normal state in water tend to gather together in bunches; i.e., floculate This bunching also entrapowater within the particle clumps. (See cut below).



With Master Builders' dispersing agent these bunches are broken up into individual cement particles distributed through the water; i.e., dispersed or defloreslated (Secont bales)



This dispersion makes the cement usable to its full efficiency; all the cement surface is made available for hydration and all the water for lubeiration of the mix. (Water held within the particle clumps is released):

The results are:-
Greater worksbility with lass water.

Increased strength.

Watertightness.

Durability (Resistance to freezing, thawing, and corresion.)

The complete story of "Cement Dispersion" will be sent on request. Ask for Research Paper No. 35.

There are two kinds of POZZOLITH, Standard and High Early. High Early provides all the advantages of Standard plus high early strengths. Send for the complete story.

THE MASTER BUILDERS COMPANY

Cleveland, Ohio

Toronto, Canad

MASTER ®
BUILDERS

(Continued from page 100)

prematurely, the wraps must lie close together.

To reduce the tendency for rope to spool unevenly, many users are employing the preformed type, since in the manufacture of this type of rope practically all internal torsional stresses are eliminated. One result of "preforming," according to the American Chain & Cable Co., is to make the rope resist rotating when passing over drums and sheaves as is common with non-preformed. This resistance to rotating, whipping, together with its freedom from "crankiness" permits preformed rope to spool much better. However, regardless of the type of rope used, all ropes should be started properly on the drum. Here's the rule:

When a right-lay rope is being underwound on the drum (which is to say, it leads from the bottom of the drum) start it from the right flange, looking at the drum from the rear. If a left lay rope, start it from the left flange. Conversely, if a right-lay rope is being overwound (that is, it leads from the top of the drum) start it from the left flange. If a left lay rope (overwound) start it from the right flange.

That's a complicated rule to remember, and more frequently than not quick reference to it is not available at the machine. Here's a far simpler rule - using your doubled-up fist to represent the drum, and the index finger to indicate the flangesuggested by the American Chain & Cable Co. With rightlay rope use the right fist. With left lay rope use the left fist. For overwound rope keep your fist back up. For underwound rope, palm up. Pointed to the drum the index finger will indicate both how the rope should lead from the drum and from which flange. The accompanying illustrations show how easily this rule may be applied.

## Gerry Trucks

#### TRANSPORT TAR

THIS CAB-OVER-ENGINE MODEL CJ sixwheel Mack truck is one of two recently purchased by the Koppers Co. to serve as ferry trucks, when hauling large loads of Tarmac from its East Providence,



R. I., plant to refill distributor trucks on various jobs. The truck transports a 2,575-gal. load and is used for work in Rhode Island, Massachusetts, and Connecticut. Its sister unit is used for similar work and has 2,130-gal. capacity.



## INDUSTRIAL BROWNHOIST BUCKETS STEP-UP PRODUCTION - HELP CUT HANDLING COSTS

Built in rope-reeve, power-wheel, lever-arm and link types, there is an Industrial Brownhoist clamshell bucket designed to best meet your specific handling needs. Durable, strong and easy to operate. Capacities from ½ to 15 yards. Write today for catalog 353.

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and that's not all—the Simplex Util-A-Tool cuts time and saves dollars on construction jobs by also clamping forms and parts for welding, bending "I"-beams and conduit, straightening and conduit, straightening bent structural members, binding loads and tensioning guy wires. Besides, it can be used as a regular 10-ton screw jack, as an emergency jack and is the most universal wheel puller yet devised.

Consists of 9 pieces of equipment in a handy metal carrying case. Costs less than \$50.00—frequently returns its cost on a single job. Ask your supply house for a demonstration.

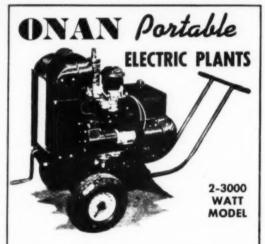


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dependable and efficient Lever Type for toe and cap lifting. Hydraulic for easier cap lifting. Screw Jacks for economy.



SPEED and MORE SPEED is required in present day construction methods. With the increase in Construction due to the present NATIONAL DEFENSE PROGRAM, manufacturing Plants must be completed in the shortest possible time. You can speed up your Jobs and at the same time increase your profits with the addition of an ONAN ELECTRIC PLANTS will supply you with AMPLE ELECTRIC PLANTS will supply you with AMPLE ELECTRIC POWER where and when you need it. Operate all Portable Tools on the Job — Drills, Saws, Sanders, Grinders, Tampers, Water Pumps, and will furnish plenty of Light for those Night Jobs.

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Shipped to you COMPLETE and READY TO GO TO WORK.

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## **NEWS FROM** MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.



GENERAL PURPOSE HOISTS

— American Hoist & Derrick
Co., St. Paul, Minn. (38 pp., illustrated.) Five models of line of gasoline, diesel and electric units, covering hoisting range of from 1 to 5 tons. One-drum model can be expanded in field to take care of more complex work by adding one or two drums and slewing attach-ment. Excess weight of ma-

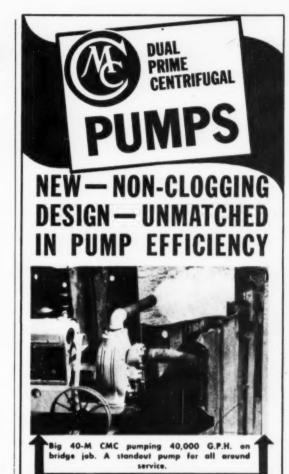
chines is eliminated by use of steel shapes and electric welding. Detailed speci-lications are given for each model in addition to tables of load and speed ratings.

PNEUMATIC TOOLS-Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (64 pp. illustrated.) Eight new pneumatic tools, latest contributions of Thor engineers, are leatured in No. 52 Pneumatic Tool catalog, 1941 edition, now ready for distribution. These new tools consist of: Right-angle distribution. These new tools consist of: Right-angle and close corner drills; right-angle nut-setters and screw drivers; bolt wrenches; grinders; chipping hammers; sanders; and saws. Catalog is fully illustrated by tool and action pictures and gives complete specifications on entire line of Thor pneumatic tools and accessories, including: Rotary and piston air drills; close corner drills; wood boring machines; wrenches and heavy tube tollers; rotary brushes; arrinders; nut setters screw drivers and tappers; or the setters screw drivers and tappers. grinders; nut setters; screw drivers and tappers; core and rivet busters; chipping, riveting, scaling and staybolt hammers; balancers; motor hoists; holderson: bench and floor rammers: rivet sets: rivet squeezers; sanders and saws; grinding, sanding, riveting and other accessories.

LIGHT ROLLER FOR ROAD MAINTENANCE—Shovel Supply Co., 1300 McKinney Ave., Dallas, Texas. (4-p. folder, illustrated.) Machine weighing 5,150 lb., designed especially for patching pavement, widening and shoulder work, is equipped with tandem rolls of which the larger—32 in. in diameter and 24 in. wide—exerts pressure of 180 lb. per linear inch. Powered by 6-hp., air-cooled gasoline engine. For quick transport from job to job the unit is equipped with a pair of pneumatic-tired wheels which can be lowered quickly by crank at front end to facilitate towing, as trailer, behind truck. Rolls are provided with self-adjustable scrapers. scrapers.

EARTH MOVING EQUIPMENT—**R. G. Le Tourneau,** Inc., Peoria, Ill. (48 pp., illustrated). Entire LeTourneau line of carryall scrapers, bulldozers, angledozers, rooters, sheepsfoot rollers, tractor cranes, power control units, Tournapulls, Tournatrailers and Tournacar welders is pictured and described in new condensed catalog (Form A-II). Complete specifications are given for each unit, together with its application. Working features of different machines are diagrammed, pictured and described.

CONCRETE GRANDSTANDS—Portland Cement Association. 33 W. Grand Ave., Chicago, Ill. (32 pp., illustrated.) This booklet is devoted primarily to information needed by the designer of small and medium-size concrete grandstands, such as location, size, layout, facilities and details of design and content of the content of th struction. General information is also given on methods of financing. Drawings of typical designs and details, and photographs of existing grandstands



Doubly fast - doubly sure. Only CMC has dual prime. Sizes up to 10"- unbeatable in performance, stamina, dependability.

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### CONSTRUCTION MACHINERY CO.

Waterloo, Iowa



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To boost a ball over the fence you need a good, husky bat. To boost the production of your drag-line—you need a Page AUTOMATIC Bucket.

A Page Bucket AUTOMATICALLY lands ready to dig . . . bites right in . . . loads faster . . . and handles easier. The result: MORE PAY DIRT MOVED PER SHIFT—more "gravy" for you!

Operators report that by using Page AUTO-MATICS they have increased their yardage 5% to 50%, with NO increase in operating cost.

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power of YOUR dragline. Mail the coupon below and get the facts about a Page AUTO-MATIC Bucket suited to your job. Do it TODAY!

PAGE ENGINEERING COMPANY Chicago, Illinois





Page Buckets are built in sizes from 3/8 to 15 cubic yards capacity, and in three weight groups . . . a bucket for every job.

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Withou	t obligating me in any way, mail a copy of your new de- e bulletin titled "Your Dragline CAN Move Dirt Faster"
Name_	
Name_	

PORTABLE ELECTRIC TOOLS-Skilsaw, Inc., 5033 Elston Ave., Chicago, III. (59 pp., illustrated.) Covers wide range of portable electric tools for production, wide range of portable electric tools for production, maintenance and construction, including saws, drills, belt and disk sanders, grinders, blowers, floor sanders. In addition to cutting wood, saws can be used on composition materials such as Transite, Masonite, Celotex, Eternite, Bakelite and Ebony asbestos. Abrasive disks may be substituted for regular saw blades on concrete, tile, slate and stone. For cutting flat or corrugated metals friction or high-speed, hollow-ground blades are recommended. Mechanical features of tools are fully described night-speed, hollow-ground blades are recommend-ed. Mechanical features of tools are fully described and illustrated. Sections of catalog are devoted to steel saw blades, abrasive disks, and electrical accessories. Saw sizes range from 6 to 12 in. di-ameter blades and drill sizes from 3/16 to 1/1 in.

ARC-WELDING OF RAIL ENDS—Lincoln Electric Co., Cleveland, Ohio (8 pp., illustrated.) An engineering discussion of methods and equipment for building up with weld metal, worn ends of rails battered by rolling stock. Notes on hardening properties of high carbon steel and procedure for obtaining maximum life for welded rail ends by Teleweld method, for which detailed specifications are given.

INDUSTRIAL MAINTENANCE PAINTS AND PROTECTIVE COATINGS—Paint Engineers. Inc., Hawthorne, N. J. (64 pp., illustrated with color samples.) Information of practical and technical character for engineer and plant manager on priming, sealing and field coats, as well as complete protective sys-tems. Complete specifications for preparation of surface and methods of applying coatings to iron, steel, alloys, galvanized metals, wood, brick, concrete and composition materials. Protechnic system of maincomposition indicated. Protectinic system of indin-tenance paints for every purpose provides means of meeting varied requirements. Among subjects cov-ered in booklet are preparation of surface and ap-plication of paints, typical paint systems, primers, metal protective paints, aluminum paints, crystalline graphite paints, dado and machinery enamels, floor enamels, heat resisting finishes, and traf-s. The company's research department is prepared to give advice on special paint problems.

PORTABLE SELF-PRIMING PUMPS—Chain Belt Co., Milwaukee, Wis. (26 pp., illustrated.) Models range from Rex, Ir., weighing only 54 lb., with 1½-in. discharge and capacity of 3,000 gp.h. to 8-in. unit weighing 2,845 lb. and having capacity of 125,000 gp.h. Design features of gasoline engine-powered units include fast automatic prime, "air peeler" for deflecting air from impeller into discharge, special suction valve, rotary seal to exclude air, free-flow water passage, corrosion-resistant metal for impeller and replaceable lin-

impeller and replaceable lin-ers. Data on how to figure right pump for job. Tables indicate water friction in of pipe and practical suction lifts for various

RUBBER HOSE—Hewitt Rubber Corp., Buffalo, N. Y. (35 pp., illustrated.) Wide range of rubber hose for various industrial and construction uses, including hose for compressed air, rock drills, cement gun work, concrete placing, water for road-building operations, dredging sleeves, grouting, jetting pneumatic tools, sand-blasting, paint spraying, steam, street and sewer flushing, oxyacetylene welding and water supply. There are also sections on couplings and packing, with tables on pipe sizes, materials affecting rubber and properties of saturated steam. For various types and sizes of hose tables show working pressures and weights per 50-ft. length.

CEMENT FLOOR FINISHER—Whiteman Mig. Co., 3249 Casitas Ave., Los Angeles, Calif. (4 pp., illustrated) New Model 41 cement floor finisher is powertrated) New Model 41 cement floor finisher is power-driven machine, either electric or gasoline, equipped with three-bladed feathering propeller with con-trolled pitch trowels, covering a 46-in, diameter circle. Operating speed, 40 to 100 r.p.m.; net weight, 187 lb. Complete operating control, finger snap-switch, V-belt drive. Circular guard prevents ac-cidents to machine or operator.

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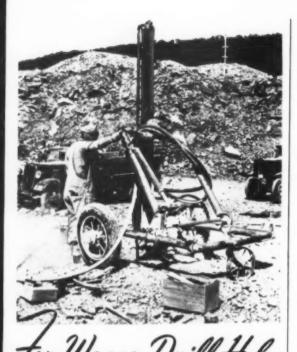
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STANDARD OIL COMPANY OF CALIFORNIA





IMPORTANT

Branch lines should lead away from main lines at right ongles. Avaid kinks and small

Deep holes of medium size can be loaded more easily and fired more effectively when Primacord-Bickford Detonating Fuse is used. One cap on the end of the Primacord will fire one hole or a thousand. A powerful detonating wave is carried to each cartridge in the hole, increasing its efficiency. Primacord also connects all holes, in a rotation planned to promote better fragmentation. Light in weight, flexible, waterproof, easy to use. Write for booklet.

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**Detonating Fuse** 

THE ENSIGN - BICKFORD CO. SIMSBURY, CONN.

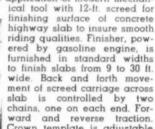
Makers of Cordean-Bickford Detonating Fuse—and Safety Fuse since 1836

CONVERTIBLE 3/4-YD. SHOVEL - Buckeye Traction Ditcher Co., Findlay, Ohio. (Leaflet, illustrated.) Full specifications given for Model 70 "Clipper" 4-yd. shovel convertible into dragline, crane or trench hoe. Machine is equipped with vacuum power con-trol system for all operations. Shipping weights, with shovel attachment, 34,500 lb., with crane attachment, 32,500 lb. Crane capacity, 7 tons at 12-ft. radius.

PORTABLE ELECTRIC TOOLS—**Black & Decker Mig.**Co., Towson, Md. (60 pp., illustrated.) Covers complete line of 132 portable electric tools, including drills, grinders, hammers, saws, sanders, screw drivers, nut runners, and wire wheel brushes. One of the new items is a  $\frac{1}{4}$ -in. standard ball-bearing drill with either side or end handle. Tools are powered by universal motors operating on either direct or single-phase alternating current from 25 to 60 cycles. Specifications and prices.

PORTABLE CABLE FOR ELECTRIC MACHINES—General Electric Co., Schenectady, N. Y. (8 pp., illustrated.) Describes tellurium portable heavy-duty, abrasion-resistant cable for carrying current to electric shovels, cranes and draglines, dredges, welders tric shovels, cranes and draglines, dredges, welders and excavating machinery. Overall jacket of 60 per cent new rubber compounded with tellurium provides tough, long-lived cover for flexible cable that can be dragged over rocks and through trash and weeds. Designed for 600 v. and for 2,500 v. and above. Tables show current-carrying capacities and physical data for cable of different sizes.

LONGITUDINAL FINISHER-Koehring Co., Milwaukee, Wis, (12 pp., illustrated). Describes design fea-tures and illustrates application of modern mechan-



ment of screed carriage across slab is controlled by two chains, one on each end. Forward and reverse traction. Crown template is adjustable for any height of crown by screw-bolts secured by lock nuts. Frame electrically welded. Finishing machine, 22 ft., weighs 6,710 lb. One man controls all operations.

DIESEL-ELECTRIC LOCOMOTIVES-Davenport Locomotive Works, Davenport, Ia. (8 pp. illustrated.) Describes characteristics and advantages of 44-ton Describes characteristics and advantages of 44-ton locomotive for use in switching and branch-line duties where heavier diesel power is more than adequate and therefore wasteful, and where use of steam locomotives is more costly. Powered by Caterpillar diesel engines. Improved lubricating system employs large oil storage in addition to small capacity oil sump. Simplified control for engineer is made possible by use of automatic transition from series to parallel and from parallel to field shunt. Close engine temperature control by shutters handled from cab and locked in any desired position. Batteries inclosed in separate cases to keep heat Batteries inclosed in separate cases to keep heat out. Adaptable both to switching and line service because of auxiliary generator which insures battery charging at all speeds.

WRENCHES—Blackhawk Mig. Co., Milwaukee, Wis. (40 pp., illustrated.) New catalog (No. 241) features developments in socket, box types, tension and specialty wrenches for industrial and construction use. Better steels reduce wrench bulk; new handles, use. Better steels reduce wrench bulk; new handles, sockets and attachments increase range of utility. Sockets are offered with "Lock-On" thumb release device and "Gripline" handles. Tabulated guide to wrench and socket sizes for bolts and nuts from 1/8- to 21/4-in. diameter. Among wrench sets is one designed especially for service jobs on tractors and contractors' equipment. On new Torkflash tension wrench light signals when proper tension is reached. Also, lubrication and tire service tools, and open end wrenches. reached. Also, lubricatio and open end wrenches.

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SLING CHAINS — American Chain & Cable Co., Bridgeport, Conn. (17 pp., illustrated.) Diversified line of quality sling chains of wrought iron, high-tensile steels and non-corro-sive alloys. In company's Endweldur process chains are made with electric welds at ends of links to provide maxi-mum safety. Tables give phys-ical specifications for corro-

end-welded. Method of calculating safe loads on single and double slings is given. Notes on care of sling chains.

DIESEL ENGINES—Caterpillar Tractor Co., Peoria, Ill. (48 pp., illustrated.) Design and construction of diesel engines described, illustrated and "X-rayed." Detailed discussion of mechanical features and manufacturing methods. The booklet (Form 5850) which deals with whys and hows of diesel engine design, makes profuse use of cutaway photographs. Various engine parts are treated separately. Crank-cases, crankshafts, cylinder liners, cylinders, valves, timing gears, governors, fuel systems, etc., are accorded sections of book, and design and manufacture of each is discussed. A section is devoted to horsepower ratings of engines. Maximum, rated and continuous horsepower are tabulated for each model. Complete specifications, dimensions and per-formance charts also are given. Booklet is printed in three colors.

ELECTRIC SAFETY SAWS—Stanley Electric Tool Division. New Britain, Conn. (Folder, illustrated.) Complete line of electric safety saws, with cutting capacities from 1½ to 6 in. Circular blade diameters from 6 to 9 in. Weights from 35 to 90 lb. Duplex handle with two triggers permits easy operation in any position. Tilting base on large model for bevel cuts. One model equipped with abrasive disk is designed for cutting stone and corrugated metal.

CONSTRUCTION EQUIPMENT — Construction Machinery Co., Waterloo, Ia. (59 pp., illustrated.) New catalog No. 41 is divided into seven main sections catalog No. 41 is divided into seven main sections covering large (up to 28S) mixers, small (3-5S) mixers, plaster, mortar and bituminous mixers, concrete batching and placing equipment, hoists, dual prime pumps and power saws. Detailed specifications tabulated for each type of machine. Design features of large mixers include renewable alloy steel drum liners, roller bearings, machined drum tracks, silent transmission and screw-type stabilizers. Several optional types of charging equipment. Bin batchers are available with bucket elevator and re-ceiving hopper. Pumps are of non-clogging design.

EYE AND FACE PROTECTORS—Sellstrom Míg. Co., 615 N. Aberdeen St., Chicago, Ill. (36 pp., illustrated). New catalog (No. 19) features equipment to prevent injuries to heads and eyes of workers, including welding lenses and helmets, welders and industrial goggles, industrial respirators, sun glasses. Two pages are devoted to safety clothing, jumpers, gloves. Design features of all helmets and goggles cover weight reduction, easy fitting adjustgles cover weight reduction, easy fitting adjust-ment, self-ventilation and comfort for wearer.

BITUMINOUS MIXER-Barber-Greene Co., Aurora, Ill. (12 pp., illustrated in color) Versatility is title of new booklet (Bulletin 842) dealing with three basic set-ups of bituminous

basic set-ups of bituminous mixer equipment, as follows (1) Travel plant for low-cost road mix; (2) central plant for "intermediate" type mixers; (3) central plant for gradation control of "high" type mixes. Correct applications, advantages and limitations of each set-up are thoroughly discussed. Emphasis is placed on single aggregate central plant which produces "intermediate" type mixes. Striking feature of publication is use of illustrations in

lication is use of illustrations in natural color pho-



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- Compact Tower and Hoist mounted as a unit on steel skids.
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- Powered with α Model 35 AMERICAN General Purpose Hoist — Gasoline powered.
- Elevator is furnished complete with wire rope — NOTHING ELSE TO BUY.

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Start the 1941 season equipped to make the most profit from every job you do.

Write today for Bulleton 200-D-5.

EARTH DRILL—**Buda Co..** Harvey, Ill. (8 pp., illustrated.) Bulletin No. 1019 describes and illustrates Buda-Hubron earth drill, power-driven machine available in variety of standard models capable of digging holes 12 in. in diameter 6 ft. deep, 42 in. in diameter 10 ft. deep and from 12 to 30 in. in diameter 24 ft. deep. With auxiliary winch and tower, holes up to 50 ft. deep can be drilled. Types include truck mounting, trailer mounting and stationary platform. Applications include pole line construction, bridge and foundation work, guard rail installation, fencing, tree planting and military operations. Spindle adjustment permits drilling of angle holes or vertical holes by compensating for truck misalignment. Design features described include lifting mechanism, drill head, controls, helix and cutters.

# Aluminum Ribs FORM FRAMEWORK FOR MOBILE TENT

(Continued from page 39)

supports, thus affording uninterrupted vision within the tent. Tents of this size, it is pointed out, might be converted into temporary hangars, field hospitals, food depots and the like, thus achieving definite military significance at the present time.

The supporting ribs are made of 61S-T aluminum sheet, extrusions, and tubing. This alloy is noted for its high strength, light weight, resistance to corrosion, good appearance, and low maintenance. Aluminum extrusions, sheet, and tubing for the framework weighed only 17,000 lb., while 1,200 lb. of aluminum tubing was used for the entrance and the auxiliary canopy. The ribs themselves were assembled by spot welding, while the spiders at either end of the roof, used as rib connectors, were arc-welded. Joints between the ribs were made in such a fashion that less than 200 bolts are required for complete erection of the framework, thus making the job of erection comparatively simple and speedy.

The aluminum alloy ribs are of a hollow box form. Their overall depth varies from 6 in. at the feet to 16 in. in the upper section, with a uniform width of  $5\frac{1}{2}$  in. To facilitate ease of transportation, the length of the individual pieces of the ribs was limited to a maximum of 35 ft., with a weight not exceeding 400 lb. Thus all ribs are easily carried in one trailer unit which takes the exhibit from place to place.

The lower end of each rib is provided with a welded steel footplate assembly, 14 in. long by 6 in. wide. Each foot has a  $3\frac{1}{2}$ -in. hole, through which a heavy peg is driven into the ground, in order to guard against both sliding and uplift. Heavy aluminum tubular sections are used to insure rigidity. They hold the ribs together at the feet, at the ridge, and midway between feet and ridge.

The exhibit was designed and built under the supervision of Charles F. Kettering, General Motors' vice-president in charge of research.



# EVERY Genuine CROSBY CLIP BRIGHT RED U-Bolt for Your

Protection

The Red U-Bolt stands for correct gripping design; Drop Forged Steel Construction; Careful Finish; Thorough Anti-Rust, Anti-Corrosion protection by Hot Dip Galvanizing; AB-SOLUTE DEPENDABILITY.

The only wire rope clip with a 58year Safety Record is the Genuine CROSBY CLIP. It has been holding wire rope SAFELY since 1883.



PLACES CONCRETE SLOPE PROTECTION

Traveling Plant

(Continued from page 65)

ment of South Carolina for development and operation of the \$41,000,000 Santee-Cooper power and navigation project, on Oct. 30, 1940; the contract stipulates a completion date of Aug. 15, 1941. Slope paving was started by the contractor early this spring.

For the South Carolina Public Service Authority, Charleston, S. C., R. M. Cooper is general manager, J. H. Moore is director of engineering and F. R. Sweeny is engineer. Engineering for design and construction of the project is by the Harza Engineering Co., Chicago, L. F. Harza, president. F. A. Dale is engineering manager on the project for the latter company.

Lowry Field Air School REQUIRES WIDE RANGE OF CONSTRUCTION

(Continued from page 63)

tion, 80x30 ft. Rafters are 2x6 in. and posts 6x6 in. The buildings are Celotexinsulated, with waterproof paper under the 8-in. drop siding. They have a canopy over the windows of the second floor. Each barrack has a hot-air heating plant, and modern shower and lavatory rooms.

Speed in erection of the temporary barracks was accomplished by building the side and end walls flat on the ground; a crane then hoists them into their normal vertical position.

The permanent barracks building .involves a cost of about \$1,500,000. It will house 2,000 officers and men and will be a complete city within itself. It is of reinforced concrete throughout, built in the panel style with 12-in, walls and pressed brick finish. The central part is four stories high with the top floor devoted to study halls. The rest of the building includes sleeping quarters, dining room,

(Continued on page 110)



rust, crack, chip or peel. See the new "Engineers Pattern Chrome Clad" at your dealers!

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# WHITEMAN Cement Floor Finisher SAVES 11,000 sq. ft. Slab!

# Whiteman HAND Tamper

nkes dry topping unnecessary, when you ave a good concrete mix. This inexpen-ve, collapsible Tamper knocks heavier ggregates down – leaves a "fat" sufficient or finish. Write for full information.

Don't let your cement floor "get away from you"-put a Whiteman Cement Floor Finisher on the job. Here's PROOF! On a recent Defense project, 13 feverishly-working finishers saw an area of 11,000 sq. ft. "getting away" from them - in the nick of time, the Contractor brought a Whiteman Finisher to the rescue. The machine finished the drying slab quickly and accurately, covering 1,000 sq. ft. in as little as 15 minutes. It not only saved the slab but made a far denser, absolutely level floor.

The Whiteman Finisher will pay for itself in a short time in less than 50,000 sq. ft. of floor, according to the experience of most contractors. The machine eliminates unnecessary costly overtime, and is real insurance against sudden shortages of ex-

A demonstration will convince you! Write TODAY for the





unnecessary weight. The machine is simple, foolproof, durable and costs less to maintain. Send for Catalogs 10 and 28 . . . for complete information about the RELIANCE line of Road Building, Maintenance and Quarry Equipment.

UNIVERSAL ROAD MACHINERY

Kingston, N. Y., U.S.A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

(Continued from page 109)

kitchen, laundry, tailor shop, etc. The boiler house and steam-heating plant is costing \$600,000.

At Lowry Field army activities will be divided into four classes: Armament, photographic laboratories, garrison barracks and aviation bombardment sections. Approximately \$10,000,000 is being spent at Lowry Field, which will be devoted principally to the training of men in fighting methods, including instruction of mechanics and photographers in the air.

# Concrete Runways

Four great plane runways of concrete were planned for the field. Runway No. 1 is 7,855 ft. long. Runway No. 4, is 7,000 ft. long, with an additional 600 ft. of earth runway. Taxi strips lie adjacent to the runways. The runways are 150 ft. wide and the largest plane built will have no difficulty in taking off here. Part of the reason for the long runways is due to the fact that Denver is 5,390 ft. above sea level, which means that 1.500 additional feet of runway is needed to allow a plane to take off in this rarified atmosphere.

The plane hangars at this field are 300 ft. long, 285 ft. wide and 93 ft. high, with a 32-ft. wide annex paralleling each hangar. The construction is a three-hinged arch steel, with steel roof trusses. The walls and roof are covered with asbestosprotected fireproof metal. A 100-ft. high control tower is built on each hangar from which all field operations will be controlled. The annex buildings are of brick, concrete and steel and will accommodate the activities of plane engineers and mechanics.

# **Extensive Bombing Range**

Adjacent to Lowry Field, a bombing range of 100 sq. mi. is provided for. Here student flyers will find ample space to practice the dropping of bombs on targets located on the rough Arapahoe county terrain.

# Railroad Facilities

Fourteen miles of railroad are included in the field layout; 90-lb. rails are used. The building of the railroad on to the field by WPA forces entailed the problem of crossing Toll Gate Creek, A bridge to accommodate the rails plus a modern graveled auto and truck highway would have cost \$50,000, engineers estimated. Hands down were put on this expenditure. Engineers in the office of the Constructing Quartermaster then designed a triple muttiple-plate culvert to take the place of the more expensive bridge. At a cost of \$23,-000 three field-assembled 15-ft. diameter culverts, each 140 ft. long with concrete aprons and expansion joints, were installed in place of the bridge.

# Contractors

Contractors engaged in construction work at Lowry Field include the following: Mead & Mount Construction Co., Denver, Colo., Air Corps Barracks; N. G. Petry, Denver, Colo., 250-bed cantonment type hospital (23 buildings); Joseph A. Bass

(Continued on page 112)



would you try a truck tire with truck tire with more solves I would," you and any of course I would," you and any of course I would," you and any of course I would," you and any today and and seconomy, speed and seconomy, speed and safety of everyone."

That's right it does, not only of truck tires but wire rope, and truck tires but wire rope,

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TO TRY

# HAZARD LAYSET Preformed

More mileage (tonnage, yardage, what have you) is characteristic of Hazard LAY-SET Wire Rope. Why? Because it is preformed at the time of manufacture, and the preforming process endows LAY-SET with extreme fatigue resistance (which means longer life). But the preformed endowment doesn't stop with merely longer service. It makes LAY-SET resist kinking and whipping, handle easier and faster—and safer. And those qualities answer your own specifications of economy, speed and safety.

Specify Hazard LAY-SET <u>Preformed</u> for fewer machine shutdowns, steadier production, reduced injuries to workmen. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

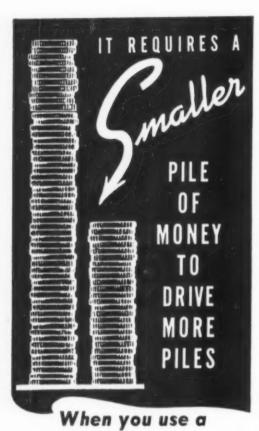
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DIFFERENTIAL-ACTING

# PILE HAMMER

18C, 30C, 50C and 80C

In short, you save money with Super-Vulcan and also you realize greater speed in driving each pile, for the Super-Vulcan gives you twice the blows per minute.



These points are pretty important ones to consider, especially now for that rush construction. Another way you save money is that the Super-Vulcan uses 25 to 35 per cent less steam.

Rugged strength-simple design—positive action
— durability — compactness are all points you should know about in greater detail.

The open type fits the same leads and uses the same accessories as the Vulcan Single-Acting Pile Hammers.

Sizes 18C-30C-50C-80C meet all needs

ULCAN IRON WORKS 331 North Bell Avenue **ILLINOIS** Chicago

(Continued from page 110)

Co., W. C. Smith, Inc., Minneapolis, Minn., temporay housing (86 bldgs.); F. J. Kirchof Construction Co., Denver, Air Corps photographic and clerical school, and armament school buildings; J. B. Bertrand, Inc., and Peter Kiewit Sons' Co., Denver, paving and drainage of runways; Manhattan Construction Co., Muskogee, Okla., hangar, annexes, and warehouse.

In addition to the foregoing contracts a number of projects at Lowry Field were handled by WPA forces.

# Shop-Built Sections OF TVA HOUSES TRUCKED TO SITE AND **BOLTED INTO UNITS**

(Continued from page 70)

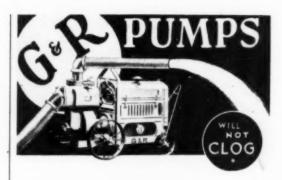
Carroll A. Towne, with the assistance of George L. Richardson, Harrison S. Gurnee and Woodruff H. Purnell, of the architectural staff, Roland A. Wank, consulting; and with the active collaboration and suggestions of the construction staff under W. B. Richardson. Mr. Grandgent, now on the architectural staff of the U.S. Housing Authority, at Washington, has been retained in a consulting capacity by TVA for the portable-cottage development. working shop, lumber yard, and builder.

In the Shoals machine shop two duplex cottages can be manufactured simultaneously, a total of 8 sections. Every section is mounted on small wheels, which in turn are mounted on tracks, so that the section can be rolled from one point to the next in the production process. Twelve to sixteen hours' working time is required to complete a section. The cost, including transportation and field assembly, promises to compare favorably with the cost of ordinary construction, the Authority's announcement states. The cabins were produced by building trades craftsmen working in their appropriate jurisdictions at prevailing wage rates.

# **Hauled on Trailers**

The portable cottages so far erected in Pickwick Park have been transported approximately 60 mi. from Muscle Shoals, some of the distance over rough country roads, in a standard truck trailer, one section at a time, in from 2 to 3 hr., with no evidence of racking. No special permit is needed for hauling the sections, since they come within the usual legal dimensions and weight of load.

It is pointed out by TVA engineers that the methods used in building the portable cottages might have especial value in connection with defense or emergency hous-



# The Most DEPENDABLE Pump For The Least Money

Claims of fastest priming, highest suction lift, more gallons per minute, etc., do not pump water. On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter - and stop.

Let G & R Pumps tell you their own story on any job. They will deliver as much, and usually more, water under any condition, than any other pump. We will ship you one and let you be the judge.

Remember this about G & R Pumps-THEY WILL NOT CLOG-THEY ASK NO TIME OUT. Play safe! That is why more contractors are standardizing on G & R Pumps than on any other make.

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50 years, McGrawHill is uniquely equipped to offer complete, authoritative direct mail coverage of Industry's major markets. Extreme accuracy is maintained (quaranteed to 98%) and through careful analysis of markets, complete classification of companies and personnel, etc., the widest possible selections are available. Send for handy reference folder "Hundreds of Thousands of Reasons Why" which describes how McGraw-Hill Lists are built and maintained.

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Mill Supply Houses
Power Services
Product Engineering & Design
Production and Maintenance
Radio Dealers & Wholesalers
Radio Engineering & Design
For further details, selections

For further details, selections from above basic classifications, counts, prices, etc., or estimates on special lists . . . ask any representative or write to



MAJOR

ing. Large groups of low-cost houses built in this fashion could be quickly and easily removed from a location after the need for them had been satisfied, and made available to areas where housing deficiencies existed or where housing was below standard.

# Designers

Development of the portable cottage was originated by Louis Grandgent when he was connected with TVA as chief of the Architectural Section. It was completed by the Authority under the supervision of

# HOW ARMY IS DIRECTING Billion Dollar Construction Program

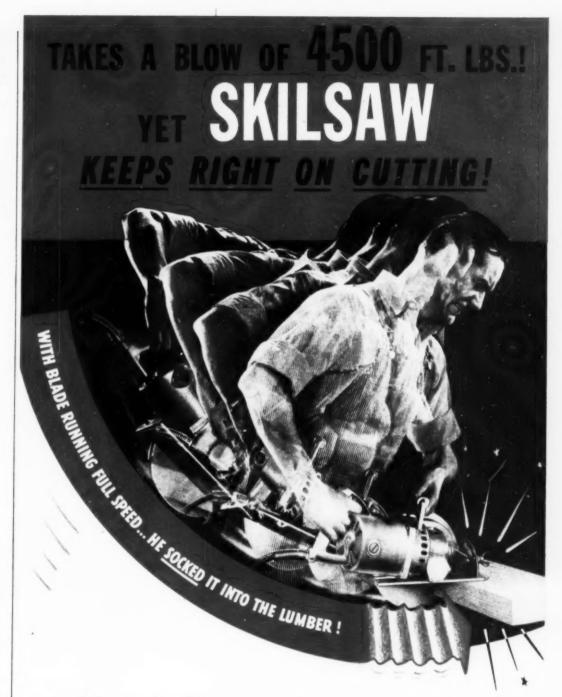
(Continued from page 69)

is charged with the duty of supervising the work of the Constructing Quartermasters in his region and has the authority to handle problems and details of policy and management that formerly had to be taken up with Washington. Matters of major importance, of course, may always be referred to the Washington office, but in general it is expected that the zone official, owing to his proximity to each project and familiarity with the scene, will be able to settle questions on the spot, thus relieving the headquarters office of a great deal of detail and expediting the program.

In the effort to staff this entire program with the best professional talent obtainable in America, each Zone Constructing Quartermaster has been provided with a Zone Engineer, a Zone Architect and a Zone Operations Officer, drawn from topranking consultants and executives of the construction industry. Included among the men who have consented to accept these assignments, all of whom are now on the job, are many of the most outstanding engineers, architects and construction executives in the United States. The beneficial effects of their connection with the program have already begun to show in many parts of the country.

# Distinguished Consultants

Not only in the field but in the Washington office, are we also seeking the finest technical skill and experience we can procure in the determination to make the Construction Division as competent an agency as exists in the Government. Recently,



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several of the best known men in their respective professions in the nation, have accepted employment in the Engineering Branch. No one in this audience of builders and contractors is unfamiliar, I am sure, with the names of Frederick Hall Fowler, of San Francisco, President of the American Society of Civil Engineers; George Edwin Bergstrom, president of the American Institute of Architects, and Warren H. McBryde, of San Francisco, Calif., past-president of the American Society of Mechanical Engineers, all of whom are with us now in Washington. Mr. Fowler has become chief of the Civil Engineering Unit; Mr. Bergstrom, chief of the Architectural Unit, and Mr. Mc-Bryde, consultant on power generation and distribution, munitions plant design, mechanical installations, etc. in the Engineering Branch.

Other prominent members of the construction industry who have joined the Washington staff in the Engineering Branch are Ernest B. Black, of Kansas City, widely known construction engineer. who will act as consultant on water supply and distribution problems; Samuel A. Greeley, of Chicago, Ill., sanitary engineer, who will advise on sewage treatment projects and sewer systems; Richmond H. Shreve, of New York City, chief architect of the Williamsburg Housing Project, and one of the designers of the Empire State Building and other well-known New York City structures, who will serve as architectural consultant; and A D. Taylor, of Cleveland, Ohio, consultant on site planning and landscape architecture for the Engineering Branch, who has just retired after his sixth consecutive term as president of the American Society of Landscape Architects.

Of highest importance, as well as interest, to all members of the contracting industry is the announcement also, that the Secretary of War has authorized the calling back into active service of Brig. General George R. Spalding, retired, who has consented to serve as additional member of the Construction Advisory Committee, in the Office of the Quartermaster General.

Also recently added to this important committee, which passes upon the qualifications of contractors seeking participation in the construction program, is Alonzo J. Hammond, of Chicago, former president of the American Society of Civil Engineers. The addition of these two eminent engineers will round out the Construction Advisory Committee to its full complement of 5 members, as originally contemplated when this agency was set up to analyze and evaluate the qualifications of contracting firms applying for Government contracts.

To Major General Edmund B. Gregory, Quartermaster General, and myself, the acceptance by Brig. General Spalding and Mr. Hammond of service on this committee, and the acceptance by the widely known engineers and architects whom I have mentioned, of service with the Engineering Branch, is a matter of deep personal gratification.

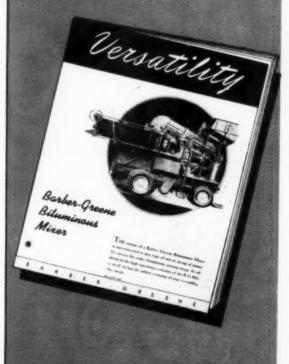
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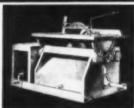
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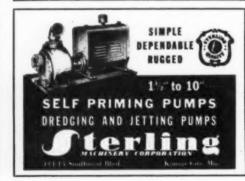
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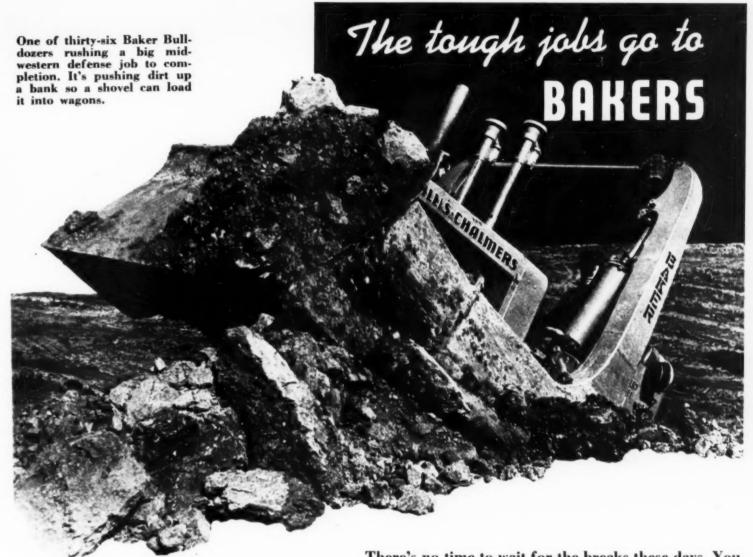
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American Hoist & Derrick Co 108, 109
Ames Baldwin Wyoming Co 76
Armco Drainage Products Assn 83
Armstrong Bros. Tool Co
Atlas Powder Co
Austin-Western Road Mach'y, Co 81
Baker Mfg. Co117
Barber-Greene Co
Bethlehem Steel Co
Black & Decker Mfg. Co., The 79 Blackhawk Mfg. Co
Blaw-Knox Co
Bostrom-Brady Mfg. Co116
Buckeye Traction Ditcher Co12, 13
Bucyrus-Erie Co 85
Byers Machine Co
Caterpillar Tractor Co
C. H. & E. Mfg. Co116
Cleveland Tractor Co Center Spread
Clyde Iron Works, Inc 100
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Commercial Shearing & Stamping Co. 90 Complete Machinery & Equipment
Co., Inc
Construction Machinery Co
Cummins Engine Co 78
Duff-Norton Mfg. Co 86
Du Pont de Nemours, E. I. Inc 30, 87
Electric Tamper & Equip. Co 76
Ensign-Bickford Co 106
Euclid Road Machy. Co 7
General Excavator Co
General Motors Truck Corp 36
Goodall Rubber Co 82
Goodyear Tire & Rubber Co 38
Gorman-Rupp Co
Griffin Wellpoint Corp
Haiss Mfg. Co., Geo 88
Harnischfeger Corp 73
Hazard Wire Rope Division American Chain & Cable Co111
Heil Company, The
Hercules Co., The 6
Hetherington & Berner, Inc 88
Hobart Bros. Co
Homelite Corporation 72
Industrial Brownhoist Corp102
Inland Steel Co2nd Cover
Insley Mfg. Corp
Iron & Steel Pdts. Inc

Jaeger Machine Co27, 33
Kelley Co., Inc., E. B
La Plant-Choate Mfg. Co. 23 Laughlin Co., The Thomas 90 Lehigh Portland Cement Co. 16 Leschen & Sons Rope Co., A. 97 Le Tourneau, Inc., R. G. 15 Link-Belt Speeder Corp. 24 Lone Star Cement Corp. 5 Lufkin Rule Co., The 109
Macwhyte Co.34Mall Tool Co.90Master Builders Co., The102McGraw-Hill Book Co., Inc.106, 118Michigan Alkali Co.102Michigan Power Shovel Co.114Moretrench Corp.107
Northwest Engineering Co 17
Onan & Sons, D. W.       103         Osgood Co., The       6         Owen Bucket Co.       84
Page Engineering Co 104
Ramsey Machry. Co.116Roebling's Sons Co., John A.22Rogers Bros. Corp.94
Schramm, Inc. 84 Searchlight Section 116 Shell Oil Co. 26 Sinclair Refining Co. 32 Skilsaw, Inc. 113 Smith Company, T. L. 75 Smith Engineering Works 101 Speedway Mfg. Co. 116 Standard Oil Co. of Calif. 105 Standard Oil Co. of Indiana 89 Sterling Machinery Corp. 116 Sterling Wheelbarrow Co. 80
Templeton, Kenly & Co.       103         Texas Company, The.       21, 99         Thew Shovel Co.       29         Thornton Tandem Co.       98         Timber Engineering Co.       10         Tower Co., A. J.       80
U. S. Steel Corp. Subsidiaries
Vulcan Iron Works112
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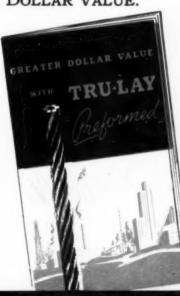
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